

9.

Eastern Pacific Expeditions of the New York Zoological Society. XL.

Mollusks from the West Coast of Mexico and Central America. Part VII.¹

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(Plate I).

[This is the fortieth of a series of papers dealing with the collections of the Eastern Pacific Expeditions of the New York Zoological Society made under the direction of William Beebe. The present paper is concerned with specimens taken on the Templeton Crocker Expedition (1936) and the Eastern Pacific Zaca Expedition (1937-1938). For data on localities, dates, dredges, etc., refer to *Zoologica*, Vol. XXII, No. 2, pp. 33-46, and Vol. XXIII, No. 14, pp. 287-298.]

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INTRODUCTION.

This is the seventh of a series of papers dealing with collections of mollusks taken on the Templeton Crocker Expedition (1936) and the Eastern Pacific Zaca Expedition (1937-1938). The general plan of presentation followed in the present contribution is that mentioned in Part II of this series of papers². Formal headings and keys are given for 51 species and subspecies of the Tellinidae collected by the expeditions of 1936 and 1937-1938. Occasionally additional species are included in the keys for convenience but in such cases it is indicated which species do not occur in the present collection.

Acknowledgment is due Dr. G. Dallas Hanna, Curator, Department of Paleontology of the California Academy of Sciences, Mr. A. G. Smith, Research Associate of the same institution, and Dr. A. Myra Keen, Stanford University, California, for assistance and suggestions. Acknowledgment is also due Miss Viola Bristol, Curator of Mollusks, San Diego Society of Natural History, for the loan of specimens. The photographs used for illustrations on the plate were prepared by Mr. Frank L. Rogers.

² Hertlein, L. G., and Strong, A. M. Eastern Pacific Expeditions of the New York Zoological Society. XXIII. Mollusks from the West Coast of Mexico and Central America. Part II. *Zoologica*, New York Zool. Soc., Vol. 28, Pt. 3, December 6, 1943, pp. 149-168, pl. 1. See especially pp. 149-150.

¹ Contribution No. 842, Department of Tropical Research, New York Zoological Society.

Superfamily Tellinacea.

FAMILY TELLINIDAE.

Papers by Dall³ and Salisbury⁴ dealing with the Tellinidae are very useful in a study of West American members of this family.

KEY TO THE GENERA OF THE FAMILY TELLINIDAE.

- A. Shell with lateral teeth in one or both valves
 - a. Exterior with oblique, flexuous, divaricating striae; orbicular..... *Strigilla*
 - aa. Exterior usually without, sometimes with, oblique but not flexuous, divaricating striae
 - b. Dorsal margins serrate; trigonal; very inequivalve and compressed *Tellidora*
 - bb. Dorsal margins not serrate or occasionally so only posteriorly; usually elongate *Tellina*
- B. Shell without lateral teeth
 - a. Suborbicular to subtrigonal; subequilateral; moderately inflated; broad submedian concavity in right valve *Apolymetis*
 - aa. Subtrigonal or elongate; posterior end produced and narrowed; moderately compressed; sometimes inequivalve *Macoma*

Genus *Tellina* Linnaeus.

The present collection from the tropical eastern Pacific contains a good representation of the species of *Tellina* which occur in that region. Many of these shells are conspicuous because of their beautiful red color, especially when observed upon the beach. Mörch long ago mentioned that red *Tellinas* are characteristic of tropical American waters.

KEY TO THE SUBGENERA OF *Tellina*.

- A. Posterior area with simple concentric lamellae or smooth
 - a. Surface obliquely grooved..... *Scissula*
 - aa. Surface not obliquely grooved
 - b. Beaks anteriorly directed *Macaliopsis*
 - bb. Beaks not anteriorly directed
 - c. Right anterior lateral distant from the beak
 - d. Smooth, polished *Tellina s.s.*⁵
 - dd. Strong concentric sculpture *Tellinella*

- cc. Right anterior lateral extends close beneath or near beak
 - e. Shell usually exceeding 25 mm. in length
 - f. Resilium external; shell elongate
 - g. Thick; right posterior lateral strong *Eurytellina*
 - gg. Thin; right posterior lateral weak; fine reticulate sculpture *Tellinidella*
 - ff. Resilium internal; shell thin, high *Scrobiculina*
- ee. Shell not exceeding 25 mm. in length (usually not exceeding 20 mm.)
 - h. Sculpture chiefly of concentric lines of growth (except on posterior area) *Moerella*
 - hh. Sculpture chiefly of concentric lamellae (over entire shell); trigonal; strong, very narrow posterior flexure *Merisca*

- B. Posterior area with plate-like foliations or posterior end with strong radial sculpture
 - a. Pallial sinus free or confluent with pallial line for not more than one-third its length
 - b. Posterior area with plate-like foliations *Phyllodina*
 - bb. Posterior end of shell with strong radial sculpture; very small *Elliplotellina*
 - aa. Pallial sinus confluent with pallial line for entire length..... *Phyllodella*

Subgenus *Tellinella* Mörch.

Tellinella Gray, Mörch, Cat. Conch. Yoldi, Fasc. 2, 1853, p. 13. [Species originally cited under *Tellinella* include *antoni* Philippi, *interrupta* Solander, *pulchella* Lamarck, *rostrata* Linnaeus, *virgata* Linnaeus, and several others]. —Dall, Bartsch & Rehder, Bernice P. Bishop Mus., *Bull.* 153, July 25, 1938, p. 187. Type: *Tellina virgata* Linnaeus. Type (designated by Stoliczka, *Mem. Geol. Surv. India, Palaeont. Indica*, Ser. 6, Vol. 3, 1870, pp. XVII, 116): *Tellina virgata* Linnaeus [*Syst. Nat.*, ed. 10, 1758, p. 674. "Habitat in O. Indico." Illustrated by Hanley,

³ Dall, W. H. Synopsis of the Family Tellinidae and of the North American species. *Proc. U. S. Nat. Mus.*, Vol. 23, [No. 1210], November, 1900, pp. 285-326, pls. 2-4.

⁴ Salisbury, A. E. On the Nomenclature of Tellinidae, with Descriptions of new species and some remarks on Distribution. *Proc. Malacol. Soc. London*, Vol. 21, Pt. 2, July, 1934, pp. 74-91, pls. 9-14.

⁵ Not represented in the present collection.

Thes. Conch., Vol. 1, 1846, p. 228, pl. 63, fig. 212. Indian Ocean].

KEY TO THE SPECIES OF *Tellinella*.

- A. Ornamented by radial stripes or spots of chocolate or purple; distance separating pallial sinus from anterior adductor impression 5 mm. or more *cumingii*
 B. Ornamented by radial stripes or bands of golden-orange; distance separating pallial sinus from anterior adductor impression not exceeding 2 mm. *zacae*

Tellina (Tellinella) cumingii Hanley.

Tellina cumingii Hanley, *Proc. Zool. Soc. London*, September, 1844, p. 59. "Hab. Guacomayo, Central America; in coral sand."
 —Hanley, *Thes. Conch.*, Vol. 1, 1847, p. 223, pl. 58, fig. 72. "Guacomayo and America."
 —M. Smith, *Panamic Mar. Shells (Tropical Photogr. Lab., Winter Park, Florida)*, 1944, p. 64, fig. 847. Lower California to Panama. [Not the record "Red Sea?"].

Type Locality: Guacomayo, Central America.

Range: Magdalena Bay, Lower California, to the Gulf of California and south to Gorgona Island, Colombia.

Collecting Stations: Mexico: Tangola-Tangola Bay (196-D-14, 15), 5 fathoms, crushed shell; Costa Rica: Culebra Bay; Cedro Island (213-D-4), 5 fathoms, mud; off Ballena Bay, Gulf of Nicoya (213-D-15), 40 fathoms, mud.

Description: Shell elongate, narrow, rather compressed, subrostrate, somewhat biangulated and bent to the right posteriorly; yellowish-white with radiating brown or chocolate or purplish streaks or spots; sculptured with moderately fine, close, concentric lamellae which become coarser and elevated on the posterior portion of the shell; hinge with two cardinal teeth in each valve, the right posterior and left anterior cardinals grooved, and two equidistant laterals in each valve; pallial sinus rather wide (in young shells rounded but in the adult obliquely pointed at the end), projecting forward about two-thirds the distance between the two adductor impressions and for about two-thirds its length confluent with the pallial line; interior white or pale yellow or a combination of the two.

Large specimens of this species attain a length of 55 mm. or more.

Tellina interrupta Wood⁶, which ranges from North Carolina to Brazil, is a similar species. *Tellina strophia* Dall, in the Miocene of Florida, also is somewhat similar to *T. cumingii*.

⁶ *Tellina interrupta* Wood, *General Conch.*, 1815, p. 146, pl. 36, fig. 3. "Inhabits the Indian and American Seas." Also edit. 1835. [Regarding the dates of issue of this book see Pritchard & Gatliff, *Proc. Roy. Soc. Victoria*, Vol. 16 (N.S.), Pt. 1, September, 1903, p. 114; Iredale, *Proc. Malacol. Soc. London*, Vol. 15, Pts. 2 and 3, December, 1922, p. 911.

Not *Tellina interrupta* Solander, *Portland Cat.*, 1786, pp. 31, 72, 105. *Nomen nudum*.

Distribution: A few specimens of this species were taken by the expedition off western Mexico and Costa Rica. The species also is known to occur in the Pleistocene of Magdalena Bay, Lower California.

Tellina (Tellinella) zacae Hertlein & Strong, sp. nov.

Plate I, Figs. 12, 13, 17.

Shell of moderate size, elongately ovate, umbos a little posterior to the center, white, with golden-orange radiating bands of varying width; anterior end elliptically rounded, posterior end rather pointed (but acutely rounded at the extremity) and slightly bent toward the right, the ventral margin is broadly curved; right valve with an elevated, rounded, curved ridge radiating from the posterior side of the umbo to the posterior ventral margin and there is a corresponding depression in the left valve; posterior to the ridge the shell is depressed and anterior to the ridge there is a slight sinus; the early part of the shell is ornamented with fine, rounded, concentric threads, these on the adult shell become stronger and slightly irregular and somewhat lamellated posteriorly; ribs separated by interspaces of about the same width or in some instances slightly narrower, very fine concentric threads are present in the interspaces; a short but rather stout ligament on a narrow nymph is present posterior to the umbos; hinge with two cardinals in each valve, the right posterior and the left anterior ones grooved, the other two are more slender, there are two laterals in each valve, those on the right valve are strong, those on the left low and fused with the margin; pallial sinus long, rounded at the end and extending about three-fourths the length of the shell; interior whitish, the external rays showing through the shell. Dimensions of the holotype: length, 33.4 mm.; height, 15.2 mm.; convexity (both valves together), 7.8 mm.; pallial sinus extends anteriorly 25 mm. from the posterior end of the shell.

Holotype (California Acad. Sci. Paleo. Type Coll.), from Station 136-D-1, Arena Bank in the Gulf of California, Lat. 23° 29' N., Long. 109° 25' W., dredged in 45 fathoms (82 meters), mud. Paratypes were dredged in the same general region at Station 136-D-31-32, Lat. 23° 24' 30" to 23° 28' N., Long. 109° 24' to 109° 23' 30" W., in 35-42 fathoms, in sand, calcareous algae and weeds. Other specimens were dredged at Station 150-D-12, Gorda Banks in the Gulf of California, Lat. 23° 02' N., Long. 109° 28' W., in 80-90 fathoms, sand.

The shell of this new species is in general features similar to that of *Tellina cumingii* but it differs in several details. In the present species the posterior area on the left valve possesses a deep well-developed groove corresponding to a ridge in the opposite valve, while in *T. cumingii* the corresponding area on the left valve is somewhat flat-

tened and dorsally bounded by a fine incised radial line. The pallial sinus of the new species is more evenly rounded at the anterior end and extends much nearer (about three-fourths the length of the shell) the anterior adductor impression than that of *T. cumingii*. Furthermore in the color pattern the beautiful radial orange stripes on a white ground attain greater width than the purple stripes which occur on a yellowish-white ground on *T. cumingii*. The specimens of the new species in the present collection do not attain the size of *Tellina cumingii*.

Tellina zaca bears a resemblance to *Tellina crassiplicata* Sowerby as illustrated by Dall, Bartsch & Rehder⁷ from Hawaii, but is narrower anteriorly and less broadly truncated posteriorly. The original illustration of *Tellina crassiplicata*⁸ does not show any radial stripes.

Subgenus *Scrobiculina* Dall.

Scrobiculina Dall, *Proc. U. S. Nat. Mus.*, Vol. 23, No. 1210, November, 1900, p. 290. "Type, *Scrobicularia viridotincta* Carpenter."

Schumacheria Cossman, *Rev. Crit. de Paléozool.*, Vol. 6, No. 1, January, 1902, p. 52. New name for *Scrobiculina* Dall, not *Scrobiculinus* Monterosato, 1884.

Type (by original designation): *Scrobicularia viridotincta* Carpenter.

Cossman proposed the name *Schumacheria* to replace *Scrobiculina* Dall, 1900, because of the prior name *Scrobiculinus* Monterosato, 1884.

A strict interpretation of the present International Rules of Zoological Nomenclature (Article 36), allows the retention of *Scrobiculina* Dall.

KEY TO THE SPECIES OF *Scrobiculina*.

- A. Color of umbos ochraceous.....*ochracea*
B. Color of umbos yellowish-green
viridotincta

Tellina (Scrobiculina) ochracea Carpenter.

Tellina (Peronaeoderma) ochracea Carpenter, *Ann. & Mag. Nat. Hist.*, Ser. 3, Vol. 13, April, 1864, p. 312. Cape St. Lucas. Reprint in *Smithson. Miscell. Coll.*, No. 252, 1872, p. 210.

Tellina (Scrobiculina) ochracea Carpenter, Dall, *Proc. U. S. Nat. Mus.*, Vol. 23, 1900, p. 302. "Cape St. Lucas to the Gulf of California."

Type Locality: Cape San Lucas, Lower California.

Range: Cape San Lucas to the Gulf of California.

Collecting Station: Mexico: Arena Bank,

Gulf of California (136-D-6), 45 fathoms mud, *Arca conglomerate*.

Description: Two somewhat worn and broken specimens in the present collection answer to the description of *Tellina ochracea*. They are colored a light sulphurous yellow strongest near the beaks and fading gradually toward the margins. Dall (1900), states that the species was very similar to *Tellina viridotincta* Carpenter, differing only in color. From the ranges given by Dall it would seem that *Tellina viridotincta* is a more southern shell while *T. ochracea* is a species of the Gulf of California. The green tip of the beak of *T. viridotincta* may not be a constant character because Stearns and Pilsbry & Lowe have recorded it well within the range of *T. ochracea*. If the color differences do not prove to be constant, *viridotincta*, being the older name, should take precedence.

Distribution: A few specimens referred to this species were dredged by the expedition on Arena Bank in the Gulf of California in 45 fathoms.

Tellina (Scrobiculina) viridotincta Carpenter.

?*Scrobicularia virido-tincta* Carpenter, *Proc. Zool. Soc. London*, November 11, 1856, p. 160. "Hab. in Sinu Panamensi, una cum. ?*S. producta*; legit T. Bridges. Sp. un. in Mus. Cuming."

Macoma viridotincta Carpenter, Stearns, *Proc. U. S. Nat. Mus.*, Vol. 17, 1894, p. 156. La Paz; various localities in the Gulf of California.

Tellina (Scrobiculina) viridotincta Carpenter, Dall, *Proc. U. S. Nat. Mus.*, Vol. 23, 1900, p. 302. Lower California to Panama.

Tellina viridotincta Carpenter, Pilsbry & Lowe, *Proc. Acad. Nat. Sci. Philadelphia*, Vol. 84, 1932, p. 133. Espiritu Santo Island; La Paz.

Type Locality: Bay of Panama.

Range: Gulf of California to Panama.

Collecting Station: Mexico: Port Guatulco (195-D-6), 3 fathoms, sand, algae, crushed shell.

Description: Shell large, high, oval, beaks posterior to the center, anterior end elliptically rounded, ventral margin broadly rounded, posterior end tapering, subtruncately rounded and bluntly pointed at the extremity; white, umbos greenish-yellow; posterior area set off by a low umbonal ridge and anterior to this there is a low, broad, radial depression; valves ornamented with fine, rather regular, concentric threads and striae, which are more crowded and irregular on the posterior area on which, especially on the right valve, there is usually one and sometimes more fine radial ridges; the concentric sculpture is crossed by very fine, faint, radiating striae over much of the disk; the pallial sinus extends about three-fourths the length of the shell, highest somewhat anterior to the posterior adductor impression then sloping downward anteriorly where, at about 5-8 mm. from the pallial line, it is sub-

⁷ *Tellina crassiplicata* Sowerby, Dall, Bartsch & Rehder, Bernice P. Bishop Mus., *Bull.* 153, July 25, 1938, p. 187, pl. 48, figs. 5-8. Various localities in Hawaii cited, also Midway Island and Ocean Island.

⁸ *Tellina crassiplicata* Sowerby, *Conch. Icon.*, Vol. 17. *Tellina*, April, 1869, species 332, pl. 56, figs. 332a, 332b. "Hab. Sandwich Islands."

angularly or bluntly rounded and then joins the pallial line; a large sunken ligament is situated upon a nymph; hinge with two cardinals in each valve, the right posterior and left anterior ones grooved; right valve with two well-developed laterals, left valve with weak anterior lateral and the posterior lateral very slight or obsolete; interior white with blotches of greenish-yellow, especially toward the dorsal portion of the shell.

A specimen from the Gulf of California in the Henry Hemphill collection of the California Academy of Sciences, measures: length, 62 mm.; height, 44 mm.; convexity (both valves together), 14.5 mm.; pallial sinus extends anteriorly 46 mm. from the posterior end of the shell. The species attains a greater size than this.

As mentioned by Dall, about the only difference between *Tellina viridotincta* and *T. ochracea* is in color.

Distribution: One rather worn pair of valves of this species was dredged in 3 fathoms at Port Guatulco, Mexico.

Subgenus *Moerella* Fischer.

Moerella Fischer, Man. de Conchyl., Fasc. 11, June 15, 1887, p. 1147. Sole species, *Tellina donacina* Linnaeus.

Type (by monotypy): *Tellina donacina* Linnaeus. Recent, seas of Europe. Illustrated by Bucquoy, Dautzenberg & Dollfus, Moll. Mar. Roussillon, Vol. 2, Fasc. 25, March, 1898, p. 648, pl. 91, figs. 13, 14, and vars. 15-19. Mediterranean. Also other localities cited.

In the present paper nine species and subspecies have been referred to the subgenus *Moerella*. Some of these, in earlier publications, have been referred to *Angulus* Megerle von Mühlfeld. The type of *Angulus* designated by Gray, 1847, is *Tellina lanceolata* Linnaeus, a species in which the hinge is said to possess a right anterior lateral but lacking all other laterals. Salisbury, 1934, stated that only two Recent species, *T. lanceolata*, the type, and *T. armata* Sowerby, were referable to *Angulus*. However, in the explanation to his plates five species are referred to *Angulus*. It is unfortunate that this well known supraspecific group name should be applicable to so few species.

All the species in the present paper which have been referred to *Moerella*, although varying somewhat in shape, possess a right posterior lateral tooth of varying strength. This lateral occurs just below a socket which is present just below the ventral end of the nymph upon which the ligament is situated.

The results of our studies which have led us to place the following group of species under the subgenus *Moerella*, are in agreement with the conclusions reached by Gardner⁹ with regard to the east American Miocene and Pliocene species formerly referred to *Angulus*.

KEY TO THE SPECIES OF *Moerella*.

- A. Posterior end triangular or bluntly pointed
 - a. Posterior end the longer, tapering, pointed; white, yellowish or pinkish *suffusa*
 - aa. Anterior end the longer
 - b. Posterior dorsal margin sinuous; ivory white *tabogensis*
 - bb. Posterior dorsal margin straight or slightly curved
 - c. Ventral margin strongly curved; posterior end blunt; white *paziana*
 - cc. Ventral margin very gently curved
 - d. Length more than twice the height; white, occasionally yellowish *amianta*
 - dd. Length less than twice the height
 - e. Area anterior to posterior umbonal angulation strongly depressed; usually pink on dorsal margins *erythronotus*
 - ee. Area anterior to posterior umbonal angulation not depressed or only faintly so; red or pink zoned with white
 - f. Umbos moderately inflated; posterior end very short *macneilii*
 - ff. Umbos rather compressed; posterior end more attenuated; rose red *felix*
 - B. Posterior end broad, obliquely truncated
 - a. Pale rose color *arenica*
 - aa. White; posterior end more abruptly truncated *recurvata*

Tellina (Moerella) amianta Dall.

Tellina (Moerella) amianta Dall, Proc. U. S. Nat. Mus., Vol. 23, No. 1210, November, 1900, pp. 303, 317, pl. 3, fig. 12. "Dredged in 14 fathoms, sand, off Cape Tepoca, Lower California, near the head of the Gulf, by the U. S. Fish Commission at station 3019."

Type Locality: Off Cape Tepoca, Lower California, near the head of the Gulf of California, in 14 fathoms, sand.

Range: Gulf of California to Colombia.

Collecting Station: Mexico: Santa Inez Bay, Gulf of California (145-D-1, 3), 4-13 fathoms, sand; Nicaragua: Corinto (200-D-19), 12-13 fathoms, mangrove leaves, sand, also on shore in beach drift; Costa Rica: Port Parker (203-D-1, 3), 12-15 fathoms, sandy mud, shelly mud, crushed shell.

Description: Shell small, elongated, anteriorly produced and rounded, the posterior end shorter, obliquely truncated and rather

⁹ Gardner, J., U. S. Geol. Surv., Prof. Paper 142-B, 1928, p. 195; U. S. Geol. Surv., Prof. Paper 199-A, 1943, p. 94.

pointed at the extremity; sculptured with fine, close, concentric threads which toward the posterior angulation become somewhat irregular, sharper, and in the adult shell two or three ribs coalesce to form low raised lamellae on the posterior area; hinge with two cardinals in each valve, the right posterior and left anterior ones grooved, right valve with a strong fairly close anterior lateral and a small posterior lateral; pallial sinus extends near to, but does not touch, the anterior adductor impression, confluent with the pallial line below; color white or partly salmon yellow.

A large right valve dredged in Santa Inez Bay in the Gulf of California in 4-13 fathoms, measures: length, 14 mm.; height, 6.8 mm.; convexity (one valve), 2.2 mm.

The small size, elongate form which is much produced anteriorly, and fine, close, concentric sculpture are characteristic features of this species.

Specimens dredged by the expedition in Santa Inez Bay in the Gulf of California are typical of the species. Specimens collected at Corinto, Nicaragua, in beach drift, and dredged in 12-13 fathoms agree in general characters with *T. amianta* except that they are thinner. Many small specimens dredged in 12-13 fathoms off Port Parker, Costa Rica, in which the hinge, concentric sculpture and other general characters agree well with *T. amianta*, appear to represent the young of that species. Some are less elongate in proportion to the height as compared to typical *T. amianta* but this appears to be somewhat variable among these young shells.

Many small specimens in the collections of the California Academy of Sciences, dredged in the Gulf of California, are similar to *T. amianta*. Some are white, some white with pink radial streaks or dots, others yellowish-white. These bear a similarity to one of the illustrations given by Sowerby¹⁰ (pl. 47, fig. 278d) under the name of *Tellina silicula* Deshayes. That species was originally described by Deshayes¹¹ with the type locality "W. Columbia." Salisbury¹² stated that the type specimen of *T. silicula* Deshayes is referable to *Tellina rhomboides* Quoy & Gaimard, a species which occurs in the western Pacific region. According to Iredale¹³ *Tellina clathrata* Deshayes is the correct name for that species. Sowerby's figures 278a, b, c, appear to be referable to it but it seems possible that his figure 278d might be referable to a young *T. amianta*.

Distribution: This species was dredged in Santa Inez Bay, Gulf of California, in 4-13 fathoms, at Corinto, Nicaragua, in 12-13

fathoms, also in beach drift on shore, and at Port Parker, Costa Rica, in 12-15 fathoms. It also has been recorded as occurring in the Pleistocene at Magdalena Bay, Lower California.

***Tellina (Moerella) arenica* Hertlein & Strong, sp. nov.**

Plate I, Figs. 5, 11.

Tellina carpenteri Dall, Packard, *Univ. Calif. Publ. Zool.*, Vol. 14, No. 2, September 12, 1918, p. 276, pl. 25, figs. 10a, 10b. . . . "in 68 fathoms just south of the Farallon Islands."—I. S. Oldroyd, *Publ. Puget Sound Biol. Sta.*, Vol. 4, 1924, pl. 41, figs. 10a, 10b. (Copies of Packard's figures). —I. S. Oldroyd, *Stanford Univ. Publ. Univ. Ser. Geol. Sci.*, Vol. 1, 1924, pl. 44, figs. 10a, 10b. (Copies of Packard's figures).

Not *Tellina carpenteri* Dall, 1903.

Description: Shell of moderate size, transversely ovate, thin, compressed, the anterior end slightly the longer, color creamy white, salmon pink and rose in concentric zones of irregular width; anterior dorsal margin sloping gently convexly from the beaks, anterior end rounded, ventral margin broadly rounded, posterior dorsal margin gently sloping, slightly concave, posterior end obliquely truncated; posterior area defined only by a rounded umbonal angulation; sculptured with concentric lines of growth and by somewhat irregularly spaced fine, shallow, concentric grooves which on the posterior area become deeper and give rise to sublamellate sculpture; hinge of right valve with two cardinal teeth, the posterior one bifid, an anterior lateral is fairly close to the cardinals and there is a distant posterior lateral below a socket; left valve (paratype) with a bifid anterior cardinal and traces of a posterior cardinal (some valves with a thin posterior cardinal lamella); pallial sinus highly trigonal back of the beak then sloping somewhat irregularly to a position below and well separated from the anterior adductor impression, the end rounded then bending posteriorly for a very short distance where it becomes confluent with the pallial line; interior white and pink. Dimensions of the holotype: length, 24.5 mm.; height, 15 mm.; convexity (one valve), 2.5 mm.; pallial sinus extends anteriorly 19 mm. from the posterior end of the valve.

Holotype, a right valve (Calif. Acad. Sci. Paleol. Type Coll.), dredged at Station 136-D-20 in Lat. 23° 30' N., Long. 109° 26' W., in 43 fathoms, mud, on Arena Bank, at the south end of the Gulf of California. One additional specimen, a paratype, was dredged at the same locality. Three small single valves were dredged in the channel east of Cedros Island at Station 126-D-17, in 40 fathoms. Paratypes were dredged by the Templeton Crocker Expedition in 1932, near Puntarenas, Costa Rica.

Range: Farallon Islands, California, to Panama.

¹⁰ Sowerby, G. B., *Conch. Icon.*, Vol. 17, *Tellina*, October, 1868, species 278, pl. 47, fig. 278d. "Hab. W. Columbia." [Not figs. 278a, b, c.]

¹¹ *Tellina silicula* Deshayes, *Proc. Zool. Soc. London* for 1854, (issued May 16, 1855), p. 363. "Hab. Columbia. Coll. Cuming."

¹² Salisbury, A. E., *Proc. Malacol. Soc. London*, Vol. 21, Pt. 2, 1934, p. 89. See also Lamy, E., *Bull. Mus. Nat. Hist. Nat. (Paris)*, Vol. 24, No. 2, 1918, p. 116.

¹³ Iredale, T., *Mem. Queensland Mus.*, Vol. 9, Pt. 3, June 29, 1929, p. 266.

This beautiful species has often been referred to *Tellina carpenteri* Dall¹⁴, a distinct species, which has a smaller shell and a generally more northern distribution. Dall¹⁵ cited *T. carpenteri* as occurring in the Gulf of Panama at a depth of 182 fathoms. It seems probable that that record may be referable to the present species.

The form illustrated under the name of *T. carpenteri* by Packard, 1918, which was dredged in 68 fathoms just south of the Farallon Islands, the illustrations of which were reproduced by I. S. Oldroyd, appears to be identical with the present specimens. This new species differs from *T. carpenteri* in the much greater size, irregular concentric zones of color and in the stronger concentric grooves. It differs from *Tellina recurvata* Hertlein & Strong [= *T. recurva* Dall, 1900, not of Deshayes, 1844], in the much more obliquely truncated posterior end and in the pink coloration. The shell of *Tellina arenica* differs from that of *T. tabogensis* in the larger size, pink color and in that the posterior dorsal margin is slightly concave or nearly straight rather than flexuous.

Tellina (Moerella) erythronotus Pilsbry & Lowe.

Tellina (Angulus) erythronotus Pilsbry & Lowe, *Proc. Acad. Nat. Sci. Philadelphia*, Vol. 84, May 21, 1932, p. 94, pl. 12, fig. 7. "Panama, east of the city" (type). Also from Montijo Bay, Panama.

Type Locality: Panama, east of the city.

Range: Magdalena Bay, Lower California, to the Bay of Panama.

Collecting Stations: El Salvador: Meanguera Island, Gulf of Fonseca (199-D-1), 16 fathoms, sand, mud, crushed shell; La Union, Gulf of Fonseca (199-D-8-16, 19-25), 3-16 fathoms, mud, mangrove leaves; Nicaragua: Monypenny Point, Gulf of Fonseca (199-D-2-6), 4-7 fathoms, mud.

Description: Shell donaciform, moderately thin, somewhat compressed, creamy white often tinged with pink around the margins, opalescent; anteriorly elongated and rounded, ventrally gently rounded and posteriorly slightly embayed due to the presence of a shallow depressed area which occurs anterior

to the posterior umbonal ridge; posteriorly triangular and somewhat bluntly pointed, with nearly straight dorsal margin; pallial sinus long not quite touching the anterior adductor impression, along the base wholly confluent with the pallial line; hinge of right valve with a grooved anterior and a bifid posterior cardinal, the anterior lateral strong and close to the cardinals, the posterior lateral farther removed but not distant; left valve with a grooved anterior and a thin posterior cardinal lamina, anterior lateral represented by a triangular projection of the margin, a similar posterior projection faintly developed or absent.

One of the largest specimens in the present collection measures: length, 25 mm.; height, 14.5 mm.; convexity (both valves together), 7 mm.

The specimens in the present collection show all the characters of *Tellina erythronotus* mentioned by Pilsbry & Lowe.

The shell of this species appears to be very similar to that of *Tellina hiberna* Hanley¹⁶ which also has been cited as occurring at Panama. However, the shell of *T. erythronotus* appears to be somewhat more elongate in comparison to the figures of *T. hiberna* given by Hanley and Salisbury. The posterior dorsal margin of Hanley's species is said to be first convex then concave, but there is no marked convexity on the margin of *T. erythronotus*. Furthermore there is nothing in Hanley's description regarding pink or prismatic colors such as often can be observed on *T. erythronotus*.

Tellina puellula Salisbury¹⁷ (= *T. puella* C. B. Adams, not Hanley), is another closely related species. According to Pilsbry & Lowe it is larger, relatively higher and thicker than *T. erythronotus*.

Tellina hiberna was described in 1844 and it seems possible that either *T. erythronotus* or *T. puellula*, both described later, may be referable to it, but we have not the type specimens available to enable us to make any definite decision on this question.

Tellina panamensis Philippi¹⁸, from Panama, was described as white with the umbos red both exteriorly and interiorly but it was said to lack lateral teeth.

Distribution: *Tellina erythronotus* was dredged quite abundantly in the Gulf of Fonseca at a depth of 3 to 16 fathoms on a bottom of mud and mangrove leaves. The present

¹⁴ *Angulus variegatus* Carpenter, *Rept. Brit. Assoc. Adv. Sci.* for 1863 (issued August, 1864), p. 611. "Mont., Cat. Is., 20-60 fm.; rare (Neeah Bay, Swan)." Also pp. 627, 639. Reprint in *Smithson. Miscell. Coll.*, No. 252, 1872, pp. 97, 113, 125. —Carpenter, *Ann. & Mag. Nat. Hist.*, Ser. 3, Vol. 14, December, 1864, p. 423. "Hab. Neeah Bay (Swan); Monterey and Catalina Island, 20-60 fathoms, rare (Cooper)." Reprint in *Smithson. Miscell. Coll.*, No. 252, 1872, p. 235.

Not *Tellina variegata* Gmelin, *Syst. Nat.*, ed. 13, 1790, p. 8237.

Tellina (Angulus) carpenteri Dall, *Proc. U. S. Nat. Mus.*, Vol. 23, No. 1210, November, 1903, pp. 303, 320. New name for *Angulus variegatus* Carpenter, 1864, not *Tellina variegata* Gmelin, 1790. "Strait of Juan de Fuca to Lower California." Illustrated by I. S. Oldroyd, *Publ. Puget Sound Biol. Sta.*, Vol. 4, 1924, p. 51, pl. 10, fig. 4. —I. S. Oldroyd, *Stanford Univ. Publ. Univ. Ser. Geol. Sci.*, Vol. 1, 1924, p. 166, pl. 29, fig. 2. San Pedro, California.

¹⁵ *Tellina (Angulus) carpenteri* Dall, *Bull. Mus. Comp. Zool.*, Vol. 43, No. 6, October, 1908, p. 421. "U. S. S. 'Albatross', station 3355, Gulf of Panama, in 182 fathoms, mud, bottom temperature, 54° F. U. S. N. Mus. 122, 934."

¹⁶ *Tellina hiberna* Hanley, *Proc. Zool. Soc. London*, December, 1844, p. 148. "Hab. Panama and Bay of Quayaquil; six to eleven fathoms, in sandy mud: Cuming." —Hanley, *Thes. Conch.*, Vol. 1, 1846, p. 282, pl. 57, fig. 53. Original localities cited.

Tellina (Angulus) hiberna Hanley, Salisbury, *Proc. Malacol. Soc. London*, Vol. 21, Pt. 2, 1934, p. 91, pl. 13, figs. 7, 8, 9. [Illustrations of holotype and paratypes].

¹⁷ *Tellina puellula* Salisbury, *Proc. Malacol. Soc. London*, Vol. 21, Pt. 2, July, 1934, p. 86. A new name for *Tellina puella* C. B. Adams, *Ann. & Lyceum Nat. Hist. New York*, Vol. 5, July 1852, pp. 507, 546 (separate, pp. 283, 322). "Panama." Not *Tellina puella* Hanley, *Proc. Zool. Soc. London*, February, 1845, p. 165. "Hab. Senegal. Cuming, Metcalfe."

¹⁸ *Tellina panamensis* Philippi, *Zeit. f. Malakozool.*, Jahrg. 5, No. 11, 1848, p. 175. "Ad Panama legit frater E. B. Philippi."

records of occurrence furnish a long extension north of the known range of the species. The northernmost occurrence of this species known to us is that based upon a specimen in the collections of the California Academy of Sciences which was collected by C. R. Orcutt at Magdalena Bay, Lower California.

Tellina (Moerella) felix Hanley.

Plate I, Fig. 1.

Tellina felix Hanley, *Proc. Zool. Soc. London*, September, 1844, p. 71. "Hab. Panama; sandy mud, six to ten fathoms." — Hanley, *Thes. Conch.*, Vol. 1, 1846, p. 281, pl. 57, fig. 52. "Panama."

Type Locality: Panama, in 6 to 10 fathoms, sandy mud.

Range: Mazatlan, Mexico, to Zorritos, Peru.

Collecting Station: Nicaragua: Potosi and Monypenny Point, Gulf of Fonseca; Corinto (200-D-8, 9, 17, 19), 6-13 fathoms, sand, mangrove leaves, also beach drift.

Description: Shell small, elongate, anterior end much the longer, rounded, the posterior end very short and obtusely obliquely subtruncated, anterior dorsal and ventral margins nearly parallel, exterior and interior of a glossy rose red color; a posterior area is set off by an umbonal angulation; valves ornamented with fine, regular, concentric striae; hinge of right valve with two cardinals, the posterior one grooved, a strong, high, elongate anterior lateral extends almost to the beak and a small posterior lateral is present just beyond and below the posterior end of the ligamentary area; left valve with a well-developed anterior cardinal, a thin posterior cardinal lamella is almost fused to the posterior margin and a pointed projection of the nymph represents an anterior lateral; pallial sinus not quite reaching the anterior adductor impression and along the base, except for a short distance, it is confluent with the pallial line.

A specimen from the Gulf of Fonseca in the Henry Hemphill collection in the California Academy of Sciences measures approximately: length 17.2 mm.; height, 9.4 mm.; convexity (both valves together), 4.3 mm.

The shell of this little species is characterized by the beautiful glossy rose red color, weakly inflated valves, nearly parallel anterior dorsal and ventral margins, strong right anterior lateral, and by the short, obliquely subtruncated posterior end.

The shorter posterior end, more gently sloping anterior dorsal margin and deep red color are features which serve to separate *Tellina felix* from *T. tabogensis* Salisbury.

The longer, stronger, right anterior lateral and more steeply sloping posterior dorsal area just below the beaks are features separating *T. felix* from *T. carpenteri* Dall.

Carpenter¹⁹ mentioned that *Tellina puella*

C. B. Adams²⁰ [= *T. puellula* Salisbury] is "not unlike *T. felix*." The remarks of Pilsbry & Lowe seem to indicate that the species described by Adams possesses a higher, heavier shell than *T. felix*.

Distribution: Specimens of this species were dredged off Nicaragua in 6-13 fathoms and also were taken in the beach drift. It has been recorded with doubt, as occurring in the Miocene²¹ of Peru, and definitely in the Pliocene of Ecuador. This species has been cited as occurring in the Red Sea but, as mentioned by Lamy²², it does not occur in that region.

Tellina (Moerella) macneilii Dall.

Tellina (Angulus) macneilii Dall, *Proc. U. S. Nat. Mus.*, Vol. 23, No. 1210, November, 1900, pp. 303, 318, pl. 3, fig. 7. "Obtained at Guaymas, Mexico, by W. H. Dall."

Type Locality: Guaymas, Mexico.

Range: Guaymas, Mexico, to the Gulf of Nicoya, Costa Rica.

Collecting Station: Costa Rica: Cedro Island to off Ballena Bay, Gulf of Nicoya (213-D-11-17), 35-40 fathoms, mud.

Description: Shell small, solid, inequilateral, the anterior end longer, rounded, the posterior end quite short, depressed, bluntly pointed; color deep rosy, slightly zoned, and paler toward the basal margin; surface closely, sharply concentrically striated, the posterior dorsal area feebly imbricate, with a little obscure radial striulation; valves moderately full, flattish toward the middle of the disk; hinge strong, normal; internal ray obscure; pallial sinus long, nearly reaching the anterior adductor scar, wholly confluent below. Lon. 12.5, alt. 7.6, diam. 3.5 mm. (Original description).

One pair and two single valves dredged in the Gulf of Nicoya agree well with Dall's description and illustration. The largest specimen measures approximately: length 11.5 mm.; height, 7.3 mm.; convexity (both valves together), 4.2 mm. These are identical with specimens identified as *T. macneilii* in the Lowe collection in the San Diego Society of Natural History.

The hinge of this species is similar to that of *T. felix* Hanley.

Compared to *T. felix*, the valves of *T. macneilii* are more inflated in proportion to their size, less elongate, the posterior end is more abruptly truncated and the anterior dorsal margin slopes more steeply. These same characters (except the slope of the anterior dorsal margin) as well as the pink color likewise serve to separate this species from *T. tabogensis*.

Tellina guaymasensis Pilsbry & Lowe²³ is

²⁰ See footnote No. 17, p. 69.

²¹ *Tellina (Eurytellina)* cf. *felix* Hanley, Olsson, *Bull. Amer. Paleol.*, Vol. 19, No. 68, June 30, 1932, p. 123, pl. 14, fig. 8. "Tumbez formation, Que Tucillal at Zorritos." Peru. Miocene.

²² Lamy, E., *Bull. Mus. Nat. Hist. Nat. (Paris)*, Vol. 24, No. 2, 1918, p. 119 (footnote).

²³ *Tellina (Angulus) guaymasensis* Pilsbry & Lowe, *Proc. Acad. Nat. Sci. Philadelphia*, Vol. 84, May 21, 1932, p. 94, pl. 16, fig. 7. "Guaymas." Mexico.

¹⁹ Carpenter, P. P., *Proc. Zool. Soc. London*, 1863, p. 366. Reprint in *Smithson. Miscell. Coll.*, No. 252, 1872, p. 202.

quite similar to *T. macneilii* but the shell appears to be a little more depressed medially and is in greater part white with streaks of pink.

The present specimens agree well with the brief description of *Tellina deshayesii* Carpenter²⁴ from the Bay of Panama. It was said to resemble *Tellina similis* Sowerby but much more inequilateral. However the specific name proposed by Carpenter is untenable in any case because of the prior use of that combination of names, *Tellina deshayesii*, by Hanley²⁵.

Distribution: Specimens of *Tellina macneilii* were taken by the expedition in the Gulf of Nicoya in 35-40 fathoms. This record represents an extension south of the known range of this species.

Tellina (Moerella) paziana Dall.

Tellina (Moerella) paziana Dall, *Proc. U. S. Nat. Mus.*, Vol. 23, No. 1210, November, 1900, pp. 303, 318, pl. 3, fig. 8. "Dredged in 26½ fathoms, near La Paz, Lower California, by the U. S. Fish Commission, at station 2823."

Type Locality: Near La Paz, Lower California, Mexico, in 26½ fathoms.

Range: Gulf of California to Cedro Island, Costa Rica.

Collecting Stations: Mexico: Port Guatulco (195-D-2, 7, 10, 11), 3-5 fathoms, sand, gr. sand, crushed shell, dead coral; Tangola-Tangola Bay (196-D-6, 7, 13, 14, 15), 5-12.8 fathoms, sand, crushed shell; Nicaragua: Corinto (200-D-8, 9, 19), 6-13 fathoms, mangrove leaves, also on the beach; Costa Rica: Cedro Island, Gulf of Nicoya (213-D-1-10), 4-10 fathoms, mud, sand, crushed shell.

Description: Shell small, thin, white, convex, the anterior end slightly longer, rounded, the posterior end bluntly pointed; surface finely concentrically sculptured by the incremental lines, covered with a very delicate dehiscent pale straw-colored epidermis; hinge well-developed, a minute but distinct anterior or left lateral present; interior polished, only about half the lower portion of the pallial sinus confluent, the anterior part not reaching the adductor. Lon. 10.2, alt. 7, diam. 3.5 mm. (Original description).

The shell of this species is usually small, about 10-15 mm. in length. A large right valve in the present collection from Corinto, Nicaragua, measures approximately: length, 17.5 mm.; height 14 mm., convexity (one valve), 3.3 mm.; pallial sinus extends forward 12.8 mm. from the posterior margin.

The pallial sinus in this species ascends to a high rounded point slightly posterior to a line vertical with the beaks, then descends obliquely. The end is rounded and well separated from the anterior adductor impression.

Tellina paziana somewhat resembles *T. meropsis* Dall. It differs from that species in the more elongate outline, the anterior end is longer in proportion to the length, the posterior end is much more bluntly pointed and the pallial sinus is separated from the anterior adductor impression by a much wider space. According to Dall, "This differs from the young of *Scrobiculina viridotincta* Carpenter, which in outline it resembles, by being less polished, more inflated, and without the deep-set resilium."

Distribution: This species was taken by the expedition from off western Mexico to the Gulf of Nicoya, Costa Rica, in 3-13 fathoms, also on the beach. This is an extension south of the known range of this species.

Tellina (Moerella) recurvata Hertlein & Strong, sp. nov.

Plate I, Figs. 2, 3, 4, 8.

Tellina (Angulus) recurva Dall, *Proc. U. S. Nat. Mus.*, Vol. 23, No. 1210, November, 1900, pp. 304, 320, pl. 3, fig. 4. "Dredged near the head of the Gulf of California in 24 fathoms, mud, off Point Fermin."

Not *Tellina recurva* Deshayes, *Proc. Zool. Soc. London* for 1854 (issued May 16, 1855), p. 361. "Hab. Australia."—Hedley, *Proc. Linn. Soc. New South Wales*, Vol. 38, Pt. 2, 1913, p. 272. Hedley stated: "I failed to find this unfigured Australian species in the British Museum. It is recommended that the name be treated as lost and unrecognizable."

Description: Shell small, translucent white, polished, rather compressed, beaks very low, the anterior end the longer; anterior or dorsal margin gently curved, ventral margin gently rounded, posterior dorsal margin depressed below the beak, sloping gently along the ligamentary area (about 2 mm. on the type), the end obliquely sloping and roundly truncated; a weak posterior umbonal angulation present; surface of valves with concentric, chiefly incremental sculpture, the posterior area with low lamellae; hinge plate arched anterior to the beaks; right valve with two cardinals, the posterior one grooved, anterior lateral strong and fairly close to the cardinals, a posterior lateral occurs below a socket at about the end of the ligamental area; left valve with two cardinals, the posterior one sloping posteriorly, a faint projection of the margin represents an anterior lateral; pallial sinus subtriangular, extending forward about three-fourths the length of the shell but well separated from the anterior adductor impression, along the base confluent with the pallial line. Dimensions of the type: length, 12 mm.; height, 7.5 mm.; convexity (both valves together), 2.9 mm.

Holotype (Calif. Acad. Sci. Paleo. Type Coll.), from Loc. 23802 (C.A.S.), San Luis Gonzaga Bay, Gulf of California. Paratypes from the same locality. Dredged by the expedition at the following stations: Mexico: 4 miles SSW. of Maldonado Point (192-D-

²⁴ *Tellina deshayesii* Carpenter, *Proc. Zool. Soc. London*, November 11, 1856, p. 160. "Hab. in Sinu Panamensi; legit T. Bridges. Sp. un. in Mus. Cuming."

²⁵ *Tellina deshayesii* Hanley, *Proc. Zool. Soc. London*, December, 1844, p. 148. "Hab. Red Sea? Mus. Cuming, Deshayes."

1), 26 fathoms, mud; Port Guatulco (195-D-20), 23 fathoms, mud; Costa Rica: Port Parker (203-D-1), 15 fathoms, sandy mud, crushed shell.

Range: Point Firmin, Lower California, near the head of the Gulf of California, to Port Parker, Costa Rica.

Some of the shells of this species are iridescent. Dall pointed out that the shell of this species somewhat resembles that of young *Macoma yoldiformis* but is more blunt posteriorly and the hinge of course is different. The more abruptly truncated posterior end and white color are features separating the present species from *T. arenica*. Compared to *T. tabogensis* the outline of *T. recurvata* is less elongate, the anterior dorsal margin is more arcuate and the posterior dorsal margin is not flexuous. Compared to *T. buttoni* Dall, the shell of the present species is less attenuated both anteriorly and posteriorly, the posterior dorsal margin just below the beaks slopes more gently and it lacks the strong anterior ray internally which is so conspicuous in Dall's species.

Distribution: A few specimens of this species were dredged by the expedition off western Mexico in 23-26 fathoms and off Port Parker, Costa Rica, in 15 fathoms. The present record of the occurrence of this shell off Costa Rica is an extension south of the known range of the species.

***Tellina (Moerella) suffusa* Dall.**

Tellina (Angulus) suffusa Dall, *Proc. U. S. Nat. Mus.*, Vol. 23, No. 1210, November, 1900, pp. 303, 319, pl. 3, fig. 10. "Collected at San Ignacio Lagoon, Lower California, by Henry Hemphill."

Type Locality: San Ignacio Lagoon, west coast of Lower California.

Range: San Ignacio Lagoon, Lower California, to Corinto, Nicaragua.

Collecting Station: Nicaragua: Corinto, beach.

Description: Shell cuneate, very thin, convex, blunt in front, pointed behind, the posterior end slightly longer, pinkish, yellowish, or translucent white in color; surface rather strongly, closely, and irregularly concentrically striate, with an unusually large and wide lunular impression, but no escutcheon to speak of; hinge normal, delicate; interior polished; the pallial sinus high, well separated from the anterior adductor, though there seems to be no trace of a ray in the specimens examined. Lon. 13.5, alt. 9.2, diam. 4.7 mm. (Original description).

The unusually large lunular area, short, blunt anterior end and pointed posterior end are features characteristic of this little species.

Several single valves from Corinto, Nicaragua, the largest measuring 11 mm. in length, agree well with Dall's description and illustration of *Tellina suffusa*. They likewise appear to be identical with specimens of that species from Magdalena Bay in the

Hemphill collection of the California Academy of Sciences.

Tellina pumila Hanley,²⁶ described from Chile, is somewhat similar in outline but the posterior end is narrower.

Distribution: Specimens of this species were taken by the expedition only in beach drift at Corinto, Nicaragua. This is a considerable extension south of the known range of this species.

***Tellina (Moerella) tabogensis* Salisbury.**

Tellina (Angulus) panamensis Dall, *Proc. U. S. Nat. Mus.*, Vol. 23, No. 1210, November, 1900, p. 319, pl. 3, fig. 3. "Types.—No. 108557, U.S.N.M., dredged in 30 fathoms in Panama Bay by the U. S. Fish Commission, at station 2799."

Not *Tellina panamensis* Philippi, *Zeit. f. Malakozool.*, Jahrg. 5, No. 11, 1848, p. 175. "Ad Panama legit frater E. B. Philippi."

Tellina tabogensis Salisbury, *Proc. Malacol. Soc. London*, Vol. 21, Pt. 2, July, 1934, p. 86. A new name for *Tellina (Angulus) panamensis* Dall, 1900, not *Tellina panamensis* Philippi, 1848.

Type Locality: Panama Bay, in 30 fathoms.

Range: Gulf of California to Santa Elena Bay, Ecuador.

Collecting Stations: El Salvador: Meanguera Island, Gulf of Fonseca (199-D-1), 16 fathoms, sand, mud, crushed shell; La Union (199-D-13), 6 fathoms, mud; Nicaragua: Corinto (200-D-19), 12-13 fathoms, mangrove leaves; Costa Rica: Cedro Island, Gulf of Nicoya (213-D-1-10), 4-10 fathoms, mud, sand, crushed shell.

Shell small, thin, ivory white, polished, rather compressed, flexuous behind, the anterior end much the longer, produced and rounded, posterior end with the ligament rather deeply inset, margin obliquely descending to a rather blunt point; surface smooth or marked only by incremental lines, except near the basal margin, where there are a few incised lines with wider interspaces, not quite in harmony with the lines of growth; posterior dorsal area minutely concentrically rippled; hinge normal, delicate; pallial sinus large, not reaching the adductor, mostly confluent below; the elevated ray absent or obsolete. Lon. 9, alt. 5.25, diam. 2.5 mm. (Original description of *Tellina panamensis* Dall).

Fresh specimens exhibit on the surface a lovely iridescent glow (Dall).

A large series of specimens of this species dredged off El Salvador by the expedition have been compared with a series dredged at Acapulco, Mexico, in the H. N. Lowe Collection in the Museum of the San Diego Society of Natural History and with specimens

²⁶ *Tellina pumila* Hanley, *Proc. Zool. Soc. London*, September, 1844, p. 69. "Hab. Valparaiso; sandy mud, from seven to thirty fathoms."—Hanley, *Thes. Conch.*, Vol. 1, 1846, p. 279, pl. 57, fig. 41. "Valparaiso."
Tellina (Angulus) pumila Hanley, Salisbury, *Proc. Malacol. Soc. London*, Vol. 21, Pt. 2, July, 1934, p. 91, pl. 13, figs. 3 and 4. (Illustrations of holotype and paratype).

in the California Academy of Sciences. It appears from this study that Dall's type, 9 mm. in length, is a juvenile shell and that the species reaches a much larger size. A large right valve in the present collection dredged off El Salvador, measures: length, 18.3 mm.; height, 10 mm.; convexity (one valve), 2.6 mm.

The most striking features of this species are the ivory white color, iridescence in fresh shells and the flexuous posterior dorsal margin. This flexuosity is caused by the convexity of an area on the posterior dorsal margin just posterior to the ligamentary area. Some specimens are faintly tinted with pink on the umbonal area. Variation in the thickness and in the flexuosity of the posterior dorsal margin can be observed in a series of specimens. These features are most pronounced in the larger shells. The present specimens as well as a series in the Collections of the California Academy of Sciences from Panama Bay, a series in the same collection from Santa Elena Bay, Ecuador, collected by Woodbridge Williams, and a series in the H. N. Lowe collection from Acapulco, Mexico, show gradation from small, thin shells with a slightly flexuous posterior dorsal margin to fairly thick shells with strong flexuous posterior margins.

The hinge of this species is similar to that of *Tellina felix* except that the right anterior lateral is shorter and in the left valve the inner margin back of the beak is slightly thickened and some large specimens show traces of a left posterior lateral. The ivory color, longer posterior end and more convex posterior dorsal margin easily serve to separate this species from *T. felix*.

Tellina hiberna Hanley²⁷ appears to be a very similar shell. The illustrations of that species published by Hanley and Salisbury indicate that the shell is more abruptly sloping posteriorly, that there is a constricted area just anterior to the posterior umbonal ridge and anterior to this the shell is more expanded than in *T. tabogensis*.

Distribution: This species was dredged by the expedition off Meanguera Island, El Salvador, in the Gulf of Fonseca, where it occurred abundantly in 6 to 16 fathoms, off Corinto, Nicaragua, in 12-13 fathoms, and in the Gulf of Nicoya, Costa Rica, in 4-10 fathoms. It occurs north to the Gulf of California and south to Ecuador.

Subgenus *Eurytellina* Fischer.

KEY TO THE SPECIES OF *Eurytellina*.

- A. Shell white or brownish
 - a. Pallial sinus touching the anterior adductor impression
 - b. Very elongate; adult valves with a median depressed area ventrally
planulata

- bb. Shell high; without a median depressed area ventrally... *laceridens*
- aa. Pallial sinus not touching anterior adductor impression
 - c. Sculpture coarse, about 1 rib per millimeter... *panamanensis*
 - cc. Sculpture fine, about 3 ribs per millimeter... *eburnea*
- B. Shell entirely or partly some shade of pink or red
 - a. Concentric sculpture of even strength over shell
 - b. Pallial sinus confluent with a portion of the posterior margin of the anterior adductor impression
rubescens
 - bb. Pallial sinus not touching anterior adductor impression
 - c. Concentric sculpture decussated by radial striae... *princeps*²⁸
 - cc. Concentric sculpture not decussated, radial striae very fine or absent
 - d. About 10 concentric grooves per millimeter... *prora*
 - dd. About 2 or 3 concentric grooves per millimeter
 - e. Right valve with depressed area anterior to posterior umbonal angulation... *simulans*
 - ee. Right valve without depressed area anterior to posterior umbonal angulation
 - f. Posterior dorsal area with strong concentric sculpture
mantaensis
 - ff. Posterior dorsal area with weak concentric sculpture or of growth lines only
*ecuadoriana*²⁸

- aa. Concentric sculpture of unequal strength over shell
 - g. Posterior third of shell with coarse concentric lamellae giving way to fine striae anteriorly
inaequistriata
 - gg. Posterior third of shell smooth or nearly so in one or both valves, anteriorly sculptured with distant concentric grooves... *regia*

Tellina (Eurytellina) eburnea Hanley.

Tellina eburnea Hanley, *Proc. Zool. Soc. London*, September, 1844 p. 61, "Hab. Tumbez, Peru; in soft sandy mud, five fathoms." —Hanley, *Thes. Conch.*, Vol. 1, 1846, p. 241, pl. 58, fig. 91. Tumbez, Peru. —Sowerby, *Conch. Icon.*, Vol. 17, *Tellina*, 1867, species 60, pl. 13, fig. 60. Original locality cited.

²⁷ See *Tellina hiberna* Hanley, *Thes. Conch.*, Vol. 1, 1846, p. 282, pl. 57, fig. 53. "Panama; Bay of Guayaquil." —Salisbury, *Proc. Malacol. Soc. London*, Vol. 21, Pt. 2, 1934, p. 91, pl. 13, figs. 7, 8, 9. [Illustrations of holotype and paratypes].

²⁸ Not represented in the present collection.

Tellina (*Peronaeoderma*) *eburnea* Hanley, Mörch, *Malakozool. Blätter*, Bd. 7, 1860, p. 186. Sonsonate, El Salvador.

Type Locality: Tumbes, Peru, in 5 fathoms, sandy mud.

Range: Gulf of California to Tumbes, Peru.

Collecting Stations: Guatemala: 7 miles west of Champerico (197-D-1, 2), 14 fathoms, mud; El Salvador: La Libertad (198-D-1, 2), 13-14 fathoms, mud; Nicaragua: Corinto, beach; Panama: Gulf of Chiriqui (221-D-1-5), 35-40 fathoms, sandy mud.

Description: Oblong, solid, opaque, rather inequivalve, convex, whitish, glossy, clearly inequilateral, with strong deep concentric sulci, which usually become obsolete in one of the valves, and which diverge and become elevated on passing the flattened space at the upper edge of the more convex valve; ventral edge very slightly convex, curving obliquely upward anteriorly; posterior side much the shorter, subcuneiform; the ligamental edge straight, and abruptly sloping; ligament short and prominent; fold and umbonal ridge almost obsolete; inside pure white, teeth as in *punicea*. (Hanley, *Thes. Conch.*, 1846).

The largest specimen in the present collection measures: length 28.3 mm.; height, 17.8 mm. The present specimens agree well with the younger stages of a specimen of *T. eburnea* in the collection at Stanford University which was collected in Ecuador by Stanley Herold, which measures: length, 47.5 mm.; height, 29.8 mm.; convexity (both valves together), 12.6 mm.

The concentric sculpture on the posterior dorsal areas becomes stronger and raised after crossing the umbonal ridge. This feature is emphasized by Hanley and Sowerby but it is not very pronounced on the present specimens.

Tellina eburnea is very similar to *T. alternata* Say, an east American species.

Tellina laplata Pilsbry & Olsson²⁹, described from the Pliocene of Peru, is also very similar to *T. eburnea*. Compared to *T. laplata* the present specimens do not show such strong raised sculpture on the posterior dorsal areas nor is the sculpture as strong on the left anterior dorsal area as that shown in the illustrations by Pilsbry & Olsson.

The shell of *Tellina eburnea* is higher in proportion to the length as compared to that of *T. simulans*, furthermore the color is pure white both exteriorly and interiorly. The general character of the pallial sinus is similar to that of *T. simulans*. It is somewhat higher behind and extends forward almost to but does not quite touch the anterior adductor impression and is confluent with the pallial line below. The hinge is similar to that of *T. simulans* except that the right posterior lateral is less distant from the cardinals. The sculpture is much finer and the pallial sinus

extends nearer the anterior adductor impression than that of *T. panamanensis* Li.

Distribution: Specimens here referred to *Tellina eburnea* were dredged by the expedition in 13-40 fathoms, from off Guatemala and El Salvador, in the Gulf of Chiriqui, Panama, and were taken on the beach at Corinto, Nicaragua.

Tellina (*Eurytellina*) *inaequistriata* Donovan.

Plate I, Fig. 18.

Tellina inaequistriata Donovan, *Nat. Hist. Brit. Shells*, Vol. 4, 1802, pl. 123 [two figs.]. "A very rare species of *Tellina* communicated to Da Costa after his *Conchology* was published, and therefore not noticed in that work. It has been found by the late Dr. Pulteney we believe on the coast of Dorsetshire." — Chenu, *Bibl. Conchyl.*, Ser. 1, Vol. 1, 1845, p. 82, pl. 32, figs. 7, 8. [French translation of Donovan's work on Shells]. — Hanley, *Thes. Conch.*, Vol. 1, 1846, p. 238, pl. 57, fig. 58; pl. 58, fig. 80. "Bay of Guayaquil; (Cuming)." — Forbes & Hanley, *Hist. Brit. Moll.*, Vol. 1, 1853 (issued August 1, 1848), p. 314. "Inhabits the Bay of Guayaquil; was introduced by Donovan, who only surmised that it had been taken by Dr. Pulteney on the Dorset coast."

Tellina sanguinea Wood, *Gen. Conch.*, 1815, p. 159, pl. 44, fig. 2. "This shell is in the cabinet of Dr. Coombe." [No locality cited]. — Wood, *Index Test.*, 1825, p. 18, pl. 4, fig. 27. Also ed. 1828. Locality unknown. Also ed. by Hanley, 1842-1856, p. 23, pl. 4, fig. 27. "Guayaquil." [States that fig. 80 in *Thes. Conch.* represents *T. sanguinea*]. — Hanley, *Cat. Rec. Riv. Shells*, 1843, p. 67.

Tellina (*Eurytellina*) *leucogonia* Dall, *Proc. U. S. Nat. Mus.*, Vol. 23, No. 1210, November, 1900, p. 317, pl. 4, fig. 5. "Type. — No. 102182, U.S.N.M., from the Gulf of California, Stearns collection."

Type Locality: Bay of Guayaquil, Ecuador (according to Hanley and Forbes & Hanley). [Erroneously cited from the coast of Dorsetshire, England, by Donovan].

Range: Gulf of California to the Bay of Guayaquil, Ecuador. Caribbean (Dautzenberg).

Collecting Stations: Mexico: Santa Cruz Bay (195-D-19-21), 17-18 fathoms, mud, gr. mud, crushed shell; Tangola-Tangola Bay (196-D-13), 10 fathoms, gr. sand, crushed shell; Costa Rica: Port Parker (203-D-3), 12 fathoms, shelly mud.

Description: Shell ovate, compressed and rather flattish, rosy, very finely striated transversely: the striae fewer and larger at the anterior [posterior] end (Donovan).

Shell elongate, moderately thick, somewhat compressed, glossy, subequilateral, red or orange-red; a well-defined fairly broad posterior area is set off by a rounded post-umbonal ridge; posterior dorsal margin slightly rounded, sloping downward and slightly expanded along the ventral half; the ornamentation consists of concentric striae which, especially on the right valve, are very

²⁹ *Tellina* (*Eurytellina*) *laplata* Pilsbry & Olsson, *Proc. Acad. Nat. Sci. Philadelphia*, Vol. 93, September 9, 1941, p. 67, pl. 15, figs. 1-5. "Canoa formation, Punta Blanca." Ecuador. Pliocene.

strongly developed and widely spaced on about the posterior third of the shell then change abruptly to fine striae anteriorly; hinge normal for the subgenus; the pallial sinus does not quite touch the anterior adductor impression but is separated by a narrow area, wholly confluent with the pallial line below and, in general features, similar to that of *T. simulans* and *T. prora*.

A right valve in the present collection from Santa Cruz Bay, Mexico, measures: length, 23 mm.; height, 12.5 mm. It agrees well with Hanley's plate 50, figure 80. Other specimens in the collection are similar but show the strong sculpture only slightly developed anterior to the angulation.

Some of the small shells, especially left valves, almost lack strong concentric sculpture anterior to the posterior area; in such cases they may be ornamented only by faint grooves slightly out of harmony with the incremental lines.

A series of specimens in the H. N. Lowe collection of the San Diego Society of Natural History, varying in length from approximately 8.5 mm. to 26.2 mm. and identified by Lowe as *Tellina leucogonia* Dall, are identical with the present specimens. The present series together with Lowe's specimens show all variations from young smooth shells up to a large right valve with the typical sculpture of *T. inaequistriata*. We are therefore inclined to consider Dall's species as identical with *T. inaequistriata*.

The very distinct concentric sculpture, changing from coarse to fine at about the posterior third of the shell, serves to separate this form from similar west American species of the genus.

Tellina waylandvaughani Maury³⁰, described from the Miocene of Santo Domingo, is a similar species.

Distribution: Specimens of this species were dredged by the expedition in 10 to 18 fathoms from off western Mexico and Costa Rica. The present records of occurrence show the range of this species to extend from the Bay of Guayaquil north to the Gulf of California. Dautzenberg³¹ cited *Tellina inaequistriata* as occurring in the Caribbean region at the Island of Martinique and in Venezuela. He stated that he could detect no differences which would serve as a basis for separating the Caribbean shells from those illustrated under that name from the Bay of Guayaquil.

Tellina (Eurytellina) laceridens Hanley.

Tellina laceridens Hanley, *Proc. Zool. Soc. London*, September, 1844, p. 61. "Hab. Tumbez, Peru; soft sandy mud, five fathoms." "Var. testa, magis trigona . . ." "Hab. Chiriqui, West Columbia; sandy mud, three fathoms." —Hanley, *Thes. Conch.*, Vol. 1, 1846, p. 243, pl. 61, figs. 168, 176. [Not. pl. 66,

fig. 258.]. Original localities cited. —Sowerby, *Conch. Incon.*, Vol. 17, *Tellina*, 1867, species 104, pl. 20, fig. 104. Tumbez, Peru.

Type Locality: Tumbez, Peru, in 5 fathoms, soft, sandy mud.

Range: Realejo [near Corinto], Nicaragua, to Tumbez, Peru.

Collecting Stations: Nicaragua: Corinto, beach; Costa Rica: Port Culebra; Colombia: Gorgona Island.

Description: Shell elongately trigonal, beaks nearly central but slightly anteriorly placed, posterior end obliquely truncated; sculpture of fine, concentric grooves which in places are irregular, the umbonal region, and often the posterior area, relatively smooth; white, sometimes with a pinkish spot on the umbonal region; ligament large, exterior; hinge with cardinals grooved, especially the right posterior cardinal which appears ragged due to 7 to 10 grooves; the pallial sinus touches the anterior adductor impression just above the base; interior white and yellow and in large specimens with somewhat granular areas and salmon pink spots.

A specimen collected at Gorgona Island, Colombia, measures: length, 53 mm.; height, 34.8 mm.; convexity (both valves together), 11.6 mm.

Some of the characters in which this species differs from *Tellina panamanensis* Li are: the finer concentric sculpture, larger smooth umbonal area, regular sculpture along the posterior dorsal margin and in that the pallial sinus touches the anterior adductor impression.

Distribution: A few specimens of this species were collected by the expedition in the beach drift at Corinto, Nicaragua, one at Port Culebra, Costa Rica, and one at Gorgona Island, Colombia. It also has been recorded as occurring in beds of Pliocene age in Panama.

Tellina (Eurytellina) mantaensis Pilsbry & Olsson.

Tellina (Eurytellina) mantaensis Pilsbry & Olsson, *Nautilus*, Vol. 56, No. 3, January, 1943, p. 80, pl. 8, figs. 1-4. "Manta, Ecuador."

Type Locality: Manta, Ecuador.

Range: Gulf of Chiriqui, Panama, to Manta, Ecuador.

Collecting Station: Panama: Gulf of Chiriqui (221-D-1-5), 35-40 fathoms, sandy mud.

Description: Shell elongated, rather compressed, the anterior end slightly the longer, posterior end obliquely subtruncated; sculpture of flat concentric ridges which are separated by narrower grooves; the posterior area is usually ornamented by wavy raised threads and with faint radial lines on one or the other valve; hinge of right valve with a strong anterior lateral adjacent to the cardinals and a more distant posterior lateral, the laterals are smaller in the left valve; the pallial sinus reaches almost to the anterior adductor impression and in this character is similar to *T. simulans*,

³⁰ *Tellina waylandvaughani* Maury, *Bull. Amer. Paleontol.*, Vol. 5, No. 29, 1917, p. 386 (222), pl. 64 (38), figs. 7 and 8. "Zone G. Rio Gurabo at Los Quemados." Santo Domingo, Miocene.

³¹ Dautzenberg, P., *Mem. Zool. Soc. France*, Vol. 13, 1900, p. 260.

and is confluent with the pallial line below; fresh specimens are rose colored, more deeply on the umbos, and somewhat brownish colored ventrally.

Two valves in the present collection agree well with the illustrations of *T. mantaensis* Pilsbry & Olsson. The larger specimen measures approximately 21 mm. in length and 15 mm. in height.

The shell of this species differs from that of *Tellina simulans* in that it is more elongated and the dorsal margins slope more gently, especially posteriorly where the area is somewhat flattened. There also are differences in the details of the hinges of the two species. The right posterior cardinal of *T. mantaensis* reaches almost to the ventral margin of the hinge plate which beneath that tooth is strongly indented. In *T. simulans* the corresponding tooth reaches little more than halfway to the ventral margin of the hinge plate which at that point is gently rounded.

The strong concentric sculpture on the posterior dorsal area and more gently sloping anterior dorsal margin are features which serve to separate this species from *T. ecuadoriana* Pilsbry & Olsson.

Distribution: Two single valves of this species were taken by the expedition in 30-40 fathoms on a bottom of sandy mud in the Gulf of Chiriqui, Panama. This is an extension north of the known range of the species.

Tellina (Eurytellina) panamanensis Li.

Tellina panamanensis Li, *Bull. Geol. Soc. China*, Vol. 9, No. 3, October, 1930, p. 262, pl. 5, fig. 32. "Brought up by marine dredge from depths varying from 10. ft. to 40. ft. in the mud at the mouth of the Rio Grande near La Boca about one mile from the mainland in Panama Bay." "Horizon: Gatun formation."—Pilsbry, *Nautilus*, Vol. 58, No. 4, April, 1945, p. 145.

Tellina (Eurytellina) panamanensis Li, Pilsbry, *Proc. Acad. Nat. Sci. Philadelphia*, Vol. 83, November 13, 1931, p. 436, pl. 41, figs. 4, 5, 6. A Recent shell from Panama Bay.

Tellina liana Hertlein & Strong, *Nautilus*, Vol. 58, No. 3, January, 1945, p. 105. "Dredged off Meanguera Island, El Salvador, in the Gulf of Fonseca, in 16 fathoms."

Type Locality: Mouth of Rio Grande near La Boca about 1 mile from the mainland in Panama Bay, 10-40 feet, mud.

Range: Tenacatita Bay, Mexico, to the Bay of Panama.

Collecting Stations: Mexico: Tenacatita Bay (183-D-2), 30 fathoms, muddy sand; Port Guatulco (195-D-20, 21), 18-23 fathoms, mud; Tangola-Tangola Bay (196-D-17, 18), 23-30 fathoms, mud; El Salvador: Meanguera Island, Gulf of Fonseca (199-D-1), 16 fathoms, sand, mud, crushed shell.

Description: Shell similar in general outline to that of *Tellina laceridens* but more steeply truncated posteriorly; the left valve is more convex and overlaps the right along

the right anterior dorsal margin; a faint broad median concavity is present toward the ventral margin of the valves; color grayish-white covered by a thin ochraceous periostracum; the concentric sculpture consists of ridges (about 1 per millimeter) which on their upper portions are flat, on the lower sloping, crossed by fine weak radial striae; on the right valve a ridge or angulation occurs from beak to base posteriorly; on the posterior dorsal area the concentric sculpture is usually sinuated, sometimes bent back, due to the presence (although sometimes absent) of a median radial convexity; hinge with two cardinals and two laterals in each valve, the right anterior cardinal grooved, the posterior with about four sulcations, the anterior lateral close to the cardinals, the posterior lateral distant about one-third the length of the posterior dorsal margin; left valve with the anterior cardinal grooved, the posterior cardinal a thin lamella, laterals weak; pallial sinus highest beneath the beaks, descending to a broadly rounded or blunt point which is well separated from and lower than but posterior to the anterior adductor impression, along the base confluent with the pallial line. Dimensions of a typical specimen: length, 44.9; height, 29 mm.; convexity (both valves together), 13 mm.; pallial sinus extends anteriorly 34.5 mm. from posterior end of shell.

The shell of this species differs from that of *Tellina laceridens* in the more steeply sloping posterior dorsal margin, more convex valves, much coarser sculpture which, especially on the left valve, is sinuated on the posterior dorsal area, in the smaller smooth area at the beaks, less crenated cardinal teeth and in that the pallial sinus does not touch the anterior adductor impression but is separated from it by a considerable distance. The much coarser sculpture and the much greater distance between the pallial sinus and the anterior adductor impression are features separating it from *T. eburnea*.

Distribution: Specimens of *Tellina panamanensis* were dredged by the expedition from Tenacatita Bay, Mexico, to Meanguera Island, El Salvador, in 16-30 fathoms. This record of Tenacatita Bay, Mexico, is an extension north of the known range of the species. It also has been recorded as occurring in the Pliocene of Ecuador.

Tellina (Eurytellina) planulata Sowerby.

Plate I, Fig. 22.

Tellina planulata Sowerby, *Conch. Icon.*, Vol. 17, *Tellina*, June, 1867, species 186, pl. 33, fig. 186. "Hab. —?"

Type Locality: Gulf of Dulce, Costa Rica (here designated as type locality). No locality originally cited.

Range: La Libertad, El Salvador, to the Gulf of Dulce, Costa Rica.

Collecting Stations: El Salvador: La Libertad (198-D-2), 14 fathoms, mud; Costa

Rica: Gulf of Dulce; Golfito Bay, Gulf of Dulce.

Description: Shell elongate, the posterior end the longer, fairly thick, white, similar to *Tellina laceridens* in general features but longer in proportion to the height; sometimes with a low broad medial depression toward the ventral margin; posterior dorsal area set off by a slight angulation; sculpture consisting of very fine, shallow, somewhat irregularly spaced concentric grooves; right valve with two grooved cardinals, anterior lateral close to the cardinals but the posterior lateral distant about half the length of the posterior dorsal margin; left valve with a grooved anterior cardinal and posterior to this two small, thin, laminae, laterals small; the pallial sinus projects anteriorly and barely touches the base of the anterior adductor impression, along the base it is confluent with the pallial line.

A left valve measures: length, 59.2 mm.; height, 33 mm.; convexity (one valve), 6 mm.

Several single valves from the Gulf of Dulce agree so closely with Sowerby's description and figure of *Tellina planulata* that we have assigned our specimens to that species. This species was originally described without information as to the locality from which it came. Paetel³² cited the species as occurring at "Sitka," Alaska, but we have not seen any specimens from that region which appear to be referable to it. Other than Paetel's record the species apparently has not been recognized as occurring elsewhere. We therefore have designated the Gulf of Dulce as type locality. Sowerby stated that it is "A much larger and flatter shell than *Tellina eburnea*, with closer grooves and no transverse ridges on the dorsal margin of the overlapping valve." Those differences are true with regard to the present specimens. The pallial sinus in the present specimens touches the anterior adductor impression whereas in *T. eburnea* it is separated from the corresponding impression by a narrow space. Sowerby stated with regard to the posterior end: "terminal margin notched." This latter feature is not pronounced on our specimens but they are not perfectly preserved.

The present specimens closely resemble *Tellina ecuadoriana* Pilsbry & Olsson^{32a} described from Ecuador. A single valve of that species collected by the senior author at Corinto, Nicaragua, is in the collections of the California Academy of Sciences.

Compared to *Tellina ecuadoriana* the posterior dorsal margin of *T. planulata* slopes a little more steeply and the posterior area, especially on the right valve, appears to be a little narrower than the corresponding

area on the species described by Pilsbry & Olsson. The shell of the present species is white rather than rose red with whitish zones. Furthermore the pallial sinus in the present specimens touches the anterior adductor impression while in *T. ecuadoriana* the two are separated by a narrow space.

Distribution: Several valves of this species were collected by the expedition on the beach in the Gulf of Dulce, Costa Rica. One small specimen with both valves was dredged in 14 fathoms off La Libertad, El Salvador.

Tellina (Eurytellina) prora Hanley.

Tellina prora Hanley, *Proc. Zool. Soc. London*, September, 1844, p. 61. "Hab Porto St. Elena, West Columbia; sandy mud, six fathoms; and Salango, West Columbia, sandy mud, nine fathoms."—Hanley, *Thes. Conch.*, Vol. 1, 1846, p. 243, pl. 60, fig. 152. Original localities cited. — Sowerby, *Conch. Icon.*, Vol. 17, *Tellina*, 1866, species 90, pl. 18, fig. 90. Original localities cited. — Salisbury, *Proc. Malacol. Soc. London*, Vol. 21, Pt. 2, July, 1934, p. 86. "The shell ranges through the south of the Panamic and north of the Peruvian areas."

Tellina cibaica Maury, Li, *Bull. Geol. Soc. China*, Vol. 9, No. 3, 1930, p. 261, pl. 4, fig. 30. Dredged in Panama Bay. Referred to the Gatun formation, Miocene. According to Pilsbry (*Proc. Acad. Nat. Sci. Philadelphia*, Vol. 83, 1931, p. 430), Li's record was based upon "A left valve of *Tellina prora* Hanley"...

Not *Tellina cibaica* Maury, 1917. Santo Domingo, Miocene.

Type Locality: Santa Elena, Ecuador, in 6 fathoms, sandy mud (here designated as type locality). Salango, Ecuador, in 9 fathoms, sandy mud, also originally cited by Hanley.

Range: Mazatlan, Mexico, to the Bay of Guayaquil, Ecuador.

Collecting Stations: Mexico: Tangola-Tangola Bay (196-D-17), 23 fathoms, mud; Guatemala: 7 miles west of Champerico (197-D-1, 2), 14 fathoms, mud; El Salvador: La Libertad (198-D-2), 14 fathoms, mud; Meanguera Island, Gulf of Fonseca (199-D-1), 16 fathoms, sand, mud, crushed shell; La Union, Gulf of Fonseca (199-D-15), 6 fathoms, mud; Nicaragua: Potosi and Mompenny Point; Costa Rica: Port Parker (203-D-3), 12 fathoms, shelly mud; Panama: Bahia Honda (222-D-5), 11 fathoms, mud, shells, leaves.

Description: Shell ovately trigonal, smooth, polished, a posterior area set off by an angulation, colored rose pink with whitish concentric bands; sculpture of very fine closely spaced (about 10 per millimeter) incised concentric striae; hinge with two grooved cardinals in each valve, the left posterior one very narrow, two laterals in each valve, those in the left valve much the smaller; pallial sinus highest in middle part of shell, usually separated from the anterior adductor impression by about a millimeter

³² Paetel, Fr., *Cat. Conchyl.*—Samml., Vierte Neubearbeitung (Berlin: Verlag von Gebrüder Paetel), Abt. 3, 1890, p. 49.

^{32a} *Tellina (Eurytellina) ecuadoriana* Pilsbry & Olsson, *Proc. Acad. Nat. Sci. Philadelphia*, Vol. 93, September 9, 1941, p. 67, pl. 15, figs. 6, 7, 8. Canoa formation, Punta Blanca, Ecuador, Pliocene. Also Recent, Santa Elena, Ecuador (type), also at Canoa and Callo, the port of Jipijapa.

but sometimes almost, but not quite, touching, the end blunt and almost in line vertically below the posterior side of the adductor impression, along the base confluent with the pallial line.

A large specimen dredged off Guatemala measures approximately: length, 46.4 mm.; height, 17.5 mm.; convexity (both valves together), 12 mm.

The shell of this species differs from that of *Tellina rubescens* Hanley in that the posterior slope is more gently inclined, the concentric incised striae are much finer and much more closely spaced and the pallial sinus does not touch the anterior adductor impression. The very much finer and more closely spaced concentric sculpture easily serves to separate the species from *T. simulans* C. B. Adams.

The record of *Tellina prora* from the Cape Verde Islands in the Atlantic cited by Rochebrune³³ can be referred to some other species. *Tellina (Eurytellina) trinitatis* Tomlin³⁴, described from Colon Harbor on the east side of the isthmus of Panama, is said to be similar to *T. prora*.

Distribution: This species was collected by the expedition off western Guatemala, El Salvador and Nicaragua, in 6-14 fathoms on a muddy bottom. It also has been recorded as occurring in the Pliocene of Ecuador.

Tellina (Eurytellina) regia Hanley.

Tellina regia Hanley, *Proc. Zool. Soc. London*, September, 1844, p. 61. "Hab. Real Llejós, Central America; in coarse sandy mud, seven fathoms." —Hanley, *Thes. Conch.*, Vol. 1, 1846, p. 240, pl. 60, fig. 140. Original locality cited.

Type locality: Real Llejós [near Corinto], Nicaragua, in 7 fathoms, coarse, sandy mud.

Range: Known only from the type locality and vicinity.

Collecting Station: Nicaragua: Corinto, beach drift.

Description: Oblong, thin, rather compressed, almost inequivalve, subequilateral; extremely glossy, both externally and internally of a deep subpellucid purplish crimson; the surface marked with distant concentric grooves, which posteriorly become obsolete in one or both of the valves; the ventral edge nearly straight, subretuse in the middle; anterior side slightly shorter, its extremity obtusely rounded; posterior extremity almost biangulated; dorsal moderately and almost equally sloping on either side of the beaks, nearly straight posteriorly; umbonal ridge and flexure nearly obsolete; the ligament rather prominent; teeth as in *punicea*. (Hanley, *Thes. Conch.*, 1846).

³³ *Peronaeoderma prora* Hanley, Rochebrune. *Nouv. Arch. Mus. d'Hist. Nat.* (Paris), Ser. 2, Vol. 4, 1881, p. 258. "Hab.—Rade de Saint-Vincent." Cape Verde Islands.

³⁴ *Eurytellina trinitatis* Tomlin, *Jour. Conch.*, Vol. 18, No. 11, July, 1929, p. 310. "Hab. Colon Harbour, not uncommon, dead but very fresh in 5 f."

A left valve from Corinto, Nicaragua, measures approximately: length, 17 mm.; height, 10 mm.; convexity (one valve), 1.8 mm.

The outline as well as the other features of the present specimen are similar to those described for *Tellina regia* which came from the same general vicinity. The concentric ornamentation of the shell is like that described for *T. regia*, namely, distant concentric grooves which become obsolete posteriorly.

Tellina regia differs from *Tellina rubescens* in that the concentric grooves become obsolete posteriorly, the dorsal margins do not slope so steeply, and the pallial sinus does not touch the anterior adductor impression. It differs from *Tellina princeps* in lacking radial striae.

Distribution: Only one valve referred to this species was found in the beach drift at Corinto, Nicaragua.

Tellina (Eurytellina) rubescens Hanley.

Tellina rubescens Hanley, *Proc. Zool. Soc. London*, September, 1844, p. 60. "Hab. Panama and Tumbez; in sandy mud."—Hanley, *Thes. Conch.*, Vol. 1, 1846, p. 242, pl. 60, fig. 153. Tumbez, and Panama (Cuming). —Sowerby, *Conch. Icon.*, Vol. 17, *Tellina*, 1866, species 93, pl. 18, fig. 93. "Hab. Tumbez and Panama, Peru."

Type Locality: Panama in sandy mud (here designated as type locality). Tumbez, Peru, in sandy mud, also originally cited.

Range: Tenacatita Bay, Mexico, to Tumbez, Peru.

Collecting Stations: Mexico: Tenacatita Bay; El Salvador: La Union, Gulf of Fonseca (199-D-12), 5 fathoms, mud; Nicaragua: Potosi and Monypenny Point, Gulf of Fonseca; Costa Rica: Port Parker.

Description: Shell trigonally ovate, smooth, polished, colored exteriorly and interiorly by light and darker concentric bands of rose pink; posterior dorsal margin sloping steeply, the area set off by an angulation; sculpture consists of fine concentric grooves (about 2 per millimeter) and between these finer concentric striae, the whole crossed by very fine submicroscopic radial striae; hinge with two cardinals and two laterals in each valve, the right anterior cardinal usually grooved, the posterior bifid, left anterior grooved, the posterior one thin, laterals in left valve weak; anterior end of pallial sinus confluent with the lower posterior margin of the anterior adductor impression from a point just above the base to approximately the middle of the base of the impression, confluent with the pallial line below.

A large specimen from the Gulf of Fonseca measures: length, 43 mm.; height, 37 mm.; convexity (both valves together), 9.3 mm.

The shell of *Tellina rubescens* differs from that of *T. prora* Hanley in that it is higher

in proportion to the length, the posterior dorsal margin slopes more steeply, the incised concentric sculpture is more widely spaced and the pallial sinus is confluent with a portion of the posterior side of the anterior adductor impression. These same characters of proportionate height to length and that of the pallial sinus serve to separate *T. rubescens* from *T. simulans* C. B. Adams, a species in which the concentric sculpture is much more strongly developed.

Distribution: This species was taken by the expedition along the west coast of Mexico and Central America but at no place abundantly. It also has been recorded by Arnold, 1903, as occurring in the upper Pleistocene of San Pedro, California. Some of the records of the occurrence of this species at San Ignacio Lagoon and at Magdalena Bay, Lower California, are referable to *T. simulans*.

***Tellina (Eurytellina) simulans* C. B. Adams.**

Tellina simulans C. B. Adams, *Ann. Lyceum Nat. Hist. New York*, Vol. 5, July, 1852, pp. 508, 546 (separate pp. 284, 322). "Panama." Also cited from Xipixapi, Ecuador, in sandy mud at 10 fathoms. —Römer, *Neues Syst. Conchyl.-Cab. Martini-Chemnitz*, Bd. 10, Abt. 4, *Tellina*, 1872, p. 99, pl. 25, figs. 4, 5.

Tellina punicea Born, Carpenter, *Cat. Mazatlan Shells*, August, 1855, p. 35. Mazatlan, Mexico. Also earlier records cited. —Sowerby, *Conch. Icon.*, Vol. 17, *Tellina*, 1866, species 53, pl. 12, fig. 53. "Hab. Xipixapi, W. Columbia; in sandy mud, ten fathoms; H. Cuming."

Not *Tellina punicea* Born, *Test. Mus. Caes. Vind.*, 1780, p. 33, pl. 2, fig. 8. "Patria ignota." [Now believed to be a Caribbean species. See Gardner, *U. S. Geol. Surv., Prof. Paper 142-E*, 1928, p. 193].

Tellina costaricana Olsson, Li, *Bull. Geol. Soc. China*, Vol. 9, No. 3, October, 1930 p. 262, pl. 4, fig. 31. Dredged in Panama Bay at mouth of Rio Grande River in 10-40 ft. "Occurrence: Gatun Stage, Banana River, Costa Rica." "Horizon: Gatun formation." This record is based upon "Two valves of *Tellina simulans* C. B. Ad." Panama, Recent, according to Pilsbry (*Proc. Acad. Nat. Sci. Philadelphia*, Vol. 83, 1931, p. 430).

Type Locality: Panama.

Range: Scammon Lagoon, Lower California, to the Gulf of California and south to Tumbez, Peru.

Collecting Stations: Mexico: Santa Inez Bay, Gulf of California; Tenacatita Bay; 17 miles SE. × E. of Acapulco (189-D-3), 13 fathoms, mud; Nicaragua: Corinto (200-D-11, 19), 8-13 fathoms, sand, mangrove leaves; Costa Rica: Culebra Bay; 1 mile south of Golfito.

Description: Shell elongately oval, posterior dorsal margin obliquely sloping, the end obliquely truncated and slightly bent to the right, rose pink with whitish concentric bands; posterior area set off by an angula-

tion anterior to which is a shallow broad depressed area on the right valve, the posterior area bears a narrow, shallow, radial furrow which is especially noticeable on the left valve; sculpture of regular, deep, concentric grooves (about 2 or 3 per millimeter) and very fine submicroscopic radial striae; hinge with anterior laterals close to the cardinals, posterior laterals distant, weaker in left valve; the pallial sinus does not quite touch the anterior adductor impression, the end is blunt and almost in line vertically below the posterior margin of the adductor impression, along the base it is confluent with the pallial line.

A large specimen of this species in the Henry Hemphill Collection of the California Academy of Sciences from Magdalena Bay, Lower California, measures: length, 48.8 mm.; height, 29 mm.; convexity (both valves together), 11 mm.

This species, in some instances, has been cited in the earlier literature under the names of *Tellina punicea* Born and *T. rubescens* Hanley.

The shell of this species differs from that of *T. rubescens* in the greater length in proportion to the height, in the much deeper, stronger and more widely spaced concentric sculpture and in that the pallial sinus does not touch the anterior adductor impression.

Tellina simulans is similar to *T. angulosa* Gmelin (*T. punicea* of some authors), an east American species; in fact Carpenter and others considered the two to be identical. According to Adams *T. simulans* differs from the east American species in that "its furrows are deeper and are continued over the flexure, without change of depth; the interspaces are less flattened, and the lateral teeth are nearly obsolete." A comparison of specimens of *T. simulans* with a series of *T. angulosa* collected by F. M. Anderson at Cartagena Bay, Colombia, shows differences between the two. The west coast shells are more pointed posteriorly, there is a low depressed area anterior to the posterior angulation on the right valve, and the concentric grooves along the posterior dorsal margin bend more acutely upward than on the east coast shells.

Tellina princeps Hanley, described from Tumbez, Peru, is a distinct species possessing a large, red, subequilateral shell with a gently sloping posterior dorsal margin and the concentric sculpture is crossed by strong radial striae.

Distribution: This species was taken by the expeditions although not abundantly, from Santa Inez Bay, in the Gulf of California to Culebra Bay, Costa Rica. It ranges south to Peru. It also is known to occur in the Pleistocene at San Ignacio Lagoon and at Magdalena Bay, Lower California.

Subgenus *Tellinidella* Hertlein & Strong, subgen. nov.

Type: *Tellinides purpureus* Broderip & Sowerby.

Shell elongate, compressed, very thin,

with a strong posterior angulation; ornamented with fine concentric granulated ridges which are crossed by impressed radial striae forming reticulate sculpture; hinge as in *Eurytellina* but with a very small right anterior lateral and a weak posterior lateral, in the left valve the laterals are faint or obsolete.

The general outline and hinge of this new subgenus are similar to those of *Eurytellina*. The weak distant right posterior lateral and the very thin shell, which is ornamented by both concentric and radial sculpture, are characteristic features of the type species of *Tellinidella*.

Dall, 1900, placed *Tellina purpureus* Broderip & Sowerby in the subgenus *Tellinides* Lamarck³⁵. That name was proposed by Lamarck for a genus of *Tellina* with the sole species *T. timorensis* as type. No illustrations accompanied that work. Dubois³⁶ discussed Lamarck's genera but he did not illustrate the type species of *Tellinides*. Neither did Delessert, 1841, include *T. timorensis* among his illustrations of the types of Lamarck's shells. Hanley³⁷ later gave illustrations showing two views of the exterior of right valves of *T. timorensis*. Philippi³⁸ also illustrated a species under that name and gave views of both the exterior and interior of the right valve and an umbonal view of both valves. His illustrations agree well with Lamarck's description of the species. Bertin³⁹, 1878, stated that 4 type specimens of Lamarck's species were present in the collections of the Museum of Natural History in Paris. In his synonymy of the species he included references to Hanley's figures 158 and 172, Philippi's figure 3, as well as illustrations of Römer's, 1812, plate 34, figures 4-6.

It appears then that these figures may be considered to represent authentic specimens of *T. timorensis*. The right valve has two diverging cardinal teeth, a close anterior lateral and a weak close posterior lateral. The left valve is said to lack laterals. The valves are not flexed posteriorly and the posterior umbonal fold or ridge is broadly rounded and nearly obsolete.

The hinge of the right valve of *Tellina purpureus* has two diverging cardinal teeth, the posterior one strong and bifid or grooved. The posterior lateral is distant from the cardinals. A small lamina sometimes occurs near the margin above the small anterior lateral and sometimes the margin is some-

what projecting just over the posterior lateral. Furthermore the shell has a strong, angular posterior umbonal fold exteriorly and the concentric sculpture on the shell is decussated by radial grooves giving it a finely granulose character. These characters on the present shell are so different from those of *T. timorensis* that we propose a new subgenus *Tellinidella* with *Tellina purpureus* Broderip & Sowerby as type.

Tellina (Tellinidella) purpureus Broderip & Sowerby.

Tellinides purpureus Broderip & Sowerby, *Zool. Jour.*, Vol. 4, No. 15, January, 1829, p. 363. "Hab. ad littora Oceani Pacifici." — Sowerby, *Zool. Beechey's Voy.*, 1839, p. 153, pl. 42, fig. 2. "Inhabits the sandy shores of the Pacific Ocean."

Tellina (Tellinides) purpurascens Broderip & Sowerby, Hanley, *Thes. Conch.*, Vol. 1, 1846, p. 295, pl. 62, fig. 194. "Real Leijos [Llejos] Central America (Cuming)."

Not *Tellina purpurascens* Gmelin, *Linn. Syst. Nat.*, ed 13, Vol. 1, Pt. 6, 1790, p. 3237. Habitat not cited. Ref. to Lister, *Conch.*, pl. 391, fig. 230. Also "B" and "Y," ref. to Gualtieri, *Test.*, pl. 77, figs. L? and M? *Tellina purpurata* is described on p. 3243. Hab. not cited. Ref. to Gualtieri, *Test.*, pl. 77, fig. L.

Tellina broderipii "Desh. ms. (teste Cum.)" Carpenter, *Cat. Mazatlan Shells*, August, 1855, p. 32. "Mazatlan."

Tellina purpurascens Broderip & Sowerby, Sowerby, *Conch. Icon.*, Vol. 17, *Tellina*, 1867, species 103, pl. 20, fig. 103. Same locality as given by Hanley.

Type Locality: Real Llejos [near Corinto], Nicaragua (here designated as type locality). Shores of Pacific Ocean originally cited.

Range: Altata, Mexico, in the Gulf of California, to Colombia.

Collecting Stations: Mexico: Tenacatita Bay; Sihuatanejo Bay; Nicaragua: Corinto, beach drift.

Description: Shell ovately oblong, subequilateral, thin, compressed, colored a beautiful purplish-rose with the dorsal margins white; sculpture of close, decussating concentric and radial striae; posteriorly a low radial furrow is present near the dorsal margin which anteriorly is bounded by a low carina; right valve with two cardinals, the posterior one the larger and bifid, and a very close, small, anterior lateral above which there is sometimes a small lamina near the margin, and a posterior lateral distant nearly half the length of the posterior dorsal margin, above this tooth the margin is sometimes somewhat projecting; left valve with laterals obsolete; the end of the pallial sinus is considerably lower than and posterior to the anterior adductor impression, the base is confluent with the pallial line.

A right valve from Tenacatita Bay, Mexico, measures: length, 49.4 mm.; height, 26.4 mm.; convexity (one valve), 4 mm.; pallial

³⁵ *Tellinides* Lamarck, *Hist. Nat. Anim. s. Vert.*, Vol. 5, July, 1818, p. 535. Type, *Tellina timorensis*, p. 536. "Habite l'océan des grandes Indes ou austral, près de Timor."

³⁶ Dubois, C., *Epit. Lamarck's Arrang. Test.*, 1824, p. 58.

³⁷ *Tellina (Tellinides) timorensis* Lamarck, Hanley, *Thes. Conch.*, Vol. 1, 1846, p. 292, pl. 61, figs. 158 and 172. Isle of Negros, Philippines, etc.

³⁸ *Tellina timorensis (Tellinides)* Lamarck, Philippi, *Abbild. u. Beschreib. Conchyl.*, Bd. 2, Heft 4, *Tellina*, August, 1846, p. 90 (22), pl. 4, fig. 3. Timor, Philippine Islands, Sumatra, etc.

³⁹ Bertin, V., *Nouv. Arch. Mus. Hist. Nat. (Paris)*, Ser. 2, Vol. 1, 1878, p. 283. [He mentioned that *T. timorensis* is represented in the collection by specimens including "par 4 individus ordinaires de Timor (types de Lamarck)."]

sinus extends forward 36 mm. from the posterior end of the valve. The species attains a greater size than this specimen.

The original name for this species, given by Broderip & Sowerby in 1829, was *Tellinides purpureus*. Dall⁴⁰ apparently considered that combination of names preoccupied due to the fact that *Tellinides* is now considered to be a subgenus of *Tellina*, also the fact that Dillwyn⁴¹ had referred to a *Tellina purpurea*.

However, Dillwyn in a footnote, in remarking on certain of Gmelin's species, referred to Gmelin, page 3243, and on that page of Gmelin's work the species was cited as *Tellina purpurata*. It thus appears that Dillwyn's spelling of "purpurea" was a misprint and not a renaming of Gmelin's species. If this view is accepted, there then appears to be no valid reason for rejecting the original name given the west American species by Broderip & Sowerby. The name *Tellina purpurascens* which Hanley used for this species is preoccupied by *Tellina purpurascens* Gmelin, 1790. The name *Tellina broderipii* attributed to Deshayes was applied to the west American form by Carpenter.

The shell of this species bears a resemblance to that of *Tellina princeps* Hanley⁴² but is thinner, narrower, the posterior dorsal margin slopes more gently, the radial striae are stronger and the right posterior lateral is weaker.

Distribution: A few specimens of this species, nearly all right valves, were taken by the expedition along the coast of west Mexico and in the beach drift at Corinto, Nicaragua.

Subgenus *Macaliopsis* Cossmann.

KEY TO THE SPECIES OF *Macaliopsis*.

- A. Beaks directed strongly anteriorly; concentric lamellae about 1 per mm. *lyra*
 B. Beaks directed only slightly anteriorly; concentric lamellae, lower, fewer, usually about 3 per mm. *lyrica*

Tellina (Macaliopsis) lyra Hanley.

Tellina lyra Hanley, *Proc. Zool. Soc. London*, September, 1844, p. 68. "Hab. Tumbes, Peru."—Hanley, *Thes. Conch.*, Vol. 1, 1846, p. 271, pl. 62, fig. 187. Tumbes, Peru.—Sowerby, *Conch. Icon.*, Vol. 17, *Tellina*, September, 1867, species 203, pl. 36, fig. 203. Tumbes, Peru.

Type Locality: Tumbes, Peru.

Range: Lower California to Tumbes, Peru (Dall).

⁴⁰ Dall, W. H., *Proc. U. S. Nat. Mus.*, Vol. 23, 1900, p. 302.

⁴¹ Dillwyn, L. W., *Descript. Cat. Rec. Shells*, Vol. 1, 1817, p. 72, footnote.

⁴² *Tellina princeps* Hanley, *Proc. Zool. Soc. London*, September, 1844, p. 62. "Hab. Tumbes, Peru; soft sandy mud, five fathoms."—Hanley, *Thes. Conch.*, Vol. 1, 1846, p. 238, pl. 63, fig. 206. "Tumbes, Peru; (Cuming)."—Sowerby, *Conch. Icon.*, Vol. 17, *Tellina*, 1867, species 135, pl. 25, fig. 135. Tumbes, Peru.—Salisbury, *Proc. Malacol. Soc. London*, Vol. 21, Pt. 2, 1934, p. 91, pl. 9, fig. 4. [Illustration of type].

Collecting Stations: Guatemala: 7 miles west of Champerico (197-D-1, 2), 14 fathoms, mud; El Salvador: La Libertad (198-D-2), 14 fathoms, mud,

Description: Shell elliptic, thin, compressed, slightly longer anteriorly, dull white exteriorly and interiorly, beaks curved forward; anterior dorsal margin excavated below the beaks, anterior end rounded, ventral margin broadly rounded, the posterior dorsal margin nearly straight or very broadly curved and sloping posteriorly directly from the beaks; a deep smooth lunule and escutcheon present; the sculpture consists of regular, thin, sharp, raised, concentric ribs which are separated by much wider interspaces (about 1 mm. wide) but which become narrower toward the ventral margin, a narrow posterior area is set off by an umbonal carina; hinge of right valve with a strong grooved triangular posterior and a thin anterior cardinal near the margin, a strong anterior and posterior lateral present; left valve with a grooved anterior and a thin posterior cardinal tooth and lateral triangular projections of the nymph; the pallial sinus extends for about three-fifths the length of the shell, sub-trigonal above and highest just posterior to a line vertical with the beaks, then descending and narrowly elliptically rounded anteriorly then bending posteriorly and for about two-thirds of its length confluent with the pallial line.

The largest specimen in the present collection, a left valve, measures: length, 50 mm. height, 35 mm.; convexity (one valve), 6 mm.; pallial sinus extends anteriorly 29 mm. from the posterior end of the valve.

The strongly anteriorly directed beaks, more convex anterior dorsal margin which is excavated beneath the beaks, higher and more widely spaced concentric sculpture and shorter and more trigonal pallial sinus are features separating this species from *Tellina lyrica* Pilsbry & Lowe.

Tellina protolyra Anderson⁴³ is a similar species but it is smaller, less elongate, more inflated and the posterior dorsal margin is straighter than in the present species.

Tellina (Macaliopsis) aequizonata Pilsbry & Olsson⁴⁴, described from the Pliocene of Ecuador, is said to be much larger, more strongly sculptured and more circular in outline than *T. lyra*.

Distribution: A few specimens, mostly single valves, of this interesting species were dredged in 14 fathoms off Guatemala and El Salvador on a mud bottom.

Tellina (Macaliopsis) lyrica Pilsbry & Lowe.

Tellina (Macaliopsis) lyrica Pilsbry & Lowe, *Proc. Acad. Nat. Sci. Philadelphia*,

⁴³ *Tellina protolyra* F. M. Anderson, *Proc. Calif. Acad. Sci.*, Ser. 4, Vol. 18, No. 4, March 29, 1929, p. 174, pl. 21, figs. 2, 3. "From Loc. 267-B, C. A. S., horizon M-N, of the Tuberá group, Colombia; Miocene."

⁴⁴ *Tellina (Macaliopsis) aequizonata* Pilsbry & Olsson, *Proc. Acad. Nat. Sci. Philadelphia*, Vol. 93, September 9, 1941, p. 68, pl. 14, fig. 7. "Jama formation, Puerto Jama." Ecuador, Pliocene.

Vol. 84, May 21, 1932, p. 94, pl. 10, figs. 4, 4a. "Guaymas in about 20 fathoms."

Type Locality: Guaymas, Mexico, in about 20 fathoms.

Range: Gulf of California to the Gulf of Chiriqui, Panama.

Collecting Stations: Mexico: Santa Inez Bay in the Gulf of California (143-D-3, 4), 25-35 fathoms, mud, crushed shell, sand; El Salvador: La Libertad (198-D-2), 14 fathoms, mud; Panama: Gulf of Chiriqui (221-D-1-5), 35-40 fathoms, sandy mud.

Description: Shell transversely oval, beaks turned slightly forward, anterior end broadly rounded, posterior dorsal margin broadly curved and rather steeply sloping; a slight angulation sets off a narrow posterior area; lunule smooth, slightly sunken; escutcheon deeply sunken and bounded by a high keel; sculpture consists of fine, close, concentric ribs (about 3 per millimeter) which are narrower than the interspaces; right valve with a simple anterior and grooved posterior cardinal and well-developed laterals, the posterior one more distant; left valve with a grooved anterior and thin posterior lamella-like cardinal, anterior lateral weak, posterior lateral represented by a triangular projection of the margin; the pallial sinus is highest posteriorly, rounded at the end and extends forward about four-fifths the length of the shell and is separated from the anterior adductor impression by a considerable distance, for over half its length along the base it is confluent with the pallial line.

A large right valve from Santa Inez Bay in the Gulf of California measures: length, 40.2 mm.; height, 29.6 mm.; convexity (one valve), 6.5 mm.; pallial sinus extends forward 31 mm. from the posterior end of the valve.

The exterior of fresh valves shows a brilliant iridescence of spectral colors due to the fine growth lines between the concentric ridges acting as a diffraction grating.

The specimens in the present collection show the differences pointed out by Pilsbry & Lowe between this species and *Tellina lyra*. They stated: "Related to *T. lyra* Hanley, but relatively longer, with the beaks less, only very slightly, turned forward, the dorsal margin in front of them less convex, and the concavity running to the posterior basal extremity wider." The concentric ribbing on *T. lyrica* is much finer and more closely spaced than that on *T. lyra*.

Distribution: This species was dredged in Santa Inez Bay in the Gulf of California, in 25-35 fathoms, off La Libertad, El Salvador, in 14 fathoms and in the Gulf of Chiriqui, Panama, in 35-40 fathoms, in mud and sandy mud. It also has been recorded as occurring in the Pliocene of Ecuador.

Subgenus *Merisca* Dall.

KEY TO THE SPECIES OF *Merisca*.

A. Interspaces with minute radial striae

a. Rostrum attenuated posteriorly; concentric lamellae about 1 per mm.

crystallina

aa. Rostrum not attenuated posteriorly; concentric lamellae about 5 per mm.

reclusa

B. Interspaces without radial striae

proclivis

Tellina (Merisca) crystallina Spengler.

Tellina crystallina Chemnitz, Neues Syst. Conchyl.-Cab. von Martini-Chemnitz, Bd. 11, 1795, p. 210, pl. 199, figs. 1947, 1948. "Es ist diese Muschel an der Nordamericanischen Küste bey Newport auf Rhode-Island gefunden worden." (Spengler). —Spengler, *Skr. Nat. Selsk.* (Copenhagen), Vol. 4, No. 2, 1798, p. 113. "Fra Newport Long-Island." Ref. to Chemnitz, pl. 199, figs. 1947, 1948.—Wood, *General Conch.*, 1815, p. 149. [No locality cited]. Ref. to Chemnitz, pl. 199, figs. 1947, 1948.—Hanley, *Thes. Conch.*, Vol. 1, 1846, p. 270, pl. 57, fig. 43. "St. Elena, West Columbia."—Olsson, *Bull. Amer. Paleo.*, Vol. 9, No. 39, 1922, p. 421 (249), pl. 29 (26), fig. 10. Banana River, Costa Rica. Miocene. Also Recent.

Tellina (Merisca) crystallina Wood, Dall, *Proc. U. S. Nat. Mus.*, Vol. 23, 1900, pp. 293, 302, 311, pl. 2, fig. 10. Sullivan's Island, South Carolina, to Cartagena, Colombia. Lower California to Panama.—M. Smith, *Panamic Mar. Shells* (Tropical Photogr. Lab., Winter Park, Florida), p. 64, fig. 834. Lower California to Guayaquil, Ecuador. Also West Indies.

Tellina schrammi Recluz, *Journ. de Conchyl.*, Vol. 4, December, 1853, p. 152, pl. 6, figs. 7, 8. . . "habite la rade de la Pointe-à-Pitre (Guadeloupe); elle a été draguée sur un fond vaseux au fond de cette rade."

Type Locality: Newport, Rhode Island.

Range: Scammon Lagoon, Lower California, to the Gulf of California and south to Guayaquil, Ecuador. Also Atlantic, from Charleston, South Carolina, to Cartagena Bay, Colombia.

Collecting Stations: Mexico: Tangola-Tangola Bay, on beach; Nicaragua: Corinto (200-D-19), 12-13 fathoms, mangrove leaves, also on beach.

Description: Shell rather small, roundly trigonal, posteriorly rostrate, somewhat attenuated and with a sharp flexure, thin, white; sculpture of strong, raised distant, concentric ribs separated by much wider interspaces (about 1 mm. wide) although the spacing varies with various specimens, and where the lamellae cross the flexure they are V-shaped; the interspaces contain fine concentric striae (sometimes about 8) and faint radial striae; right posterior and left anterior cardinals grooved, lateral teeth in right valve well developed, in the left obsolete or nearly so; pallial sinus high behind then descending and sometimes touching the base of the anterior adductor impression, wholly confluent with the pallial line below.

The specimens in the present collection are

small but a large valve in the collections of the California Academy of Sciences, from Mazatlan, Mexico, measures: length, 23 mm.; height, 17.4 mm.; convexity (one valve), 3.4 mm.

Chemnitz originally described and illustrated *Tellina crystallina* and cited Spengler as the authority for the locality, Newport, Rhode Island. The International Committee on Zoological Nomenclature has recently ruled against acceptance of the specific names proposed by Chemnitz. Spengler next described the species. He referred to Chemnitz's description and illustrations and gave the same locality as Chemnitz. However, the species is not known with certainty to occur north of Charleston, South Carolina. One might venture the opinion that since Spengler was a citizen of Denmark, the type specimens secured by him originally might have come from the Danish West Indies.

Salisbury⁴⁵ recently stated that the east and west American shells referred to this species should be considered as separate species. So far as we have been able to determine, there is no reason to differ from Dall's⁴⁶ conclusion that "The specimens from the two oceans are absolutely similar, and differ no more than individuals from either sea among themselves." *Tellina schrammi* Recluz, described from the island of Guadeloupe in the West Indies, appears to be identical with *T. crystallina*.

Tellina errati Pilsbry & Johnson⁴⁷, described from the Miocene of Santo Domingo, is identical or a very similar form. Maury,⁴⁸ 1917, stated that fossils from Santo Domingo were identical with Recent shells found on the beach on that island.

Tellina (Merisca) sancti-dominici Maury,⁴⁹ also described from the Miocene of Santo Domingo, is a similar species. *Tellina martensi* Lynge,⁵⁰ described from the East Indies, was compared to *T. crystallina*, but the west American species is longer with a more rostrate form.

Distribution: A few specimens of this species were collected by the expedition on the beach at Tangola-Tangola, Mexico, and others were dredged in 12-13 fathoms at Corinto, Nicaragua. It also occurs from Miocene to Recent in the Caribbean region and has been recorded as occurring in the Plio-

cene of Ecuador and Pleistocene of Magdalena Bay, Lower California.

***Tellina (Merisca) proclivis* Hertlein & Strong, sp. nov.**

Plate I, Figs. 6, 7, 14.

Tellina declivis Sowerby, *Conch. Icon.*, Vol. 17, *Tellina*, March, 1868, species 261, pl. 44, fig. 261. "Hab.—?"—I. S. Oldroyd, *Stanford Univ. Publ. Univ. Ser. Geol. Sci.*, Vol. 1, 1924, p. 165 (under section *Merisca*). Catalina Island, California, to Panama.—Strong & Hertlein, *Allan Hancock Pac. Exped.*, Vol. 2, No. 12, 1939, p. 184. Bahia Honda, and off Taboga Island, Panama.

Not *Tellina declivis* Conrad, *Jour. Acad. Nat. Sci. Philadelphia*, Ser. 1, Vol. 7, 1834, p. 131. "Locality, Yorktown, Va." Tertiary. [Miocene].

Tellina (Merisca) declivis Sowerby, Dall, *Proc. U. S. Nat. Mus.*, Vol. 23, 1900, p. 301. "Cerros Island, Lower California, to the Gulf of California."

Type Locality: Magdalena Bay, Lower California, Mexico.

Range: Cedros Island, Lower California, to Panama.

Collecting Stations: Mexico: 4 miles SSW. of Maldonado Point (192-D-1), 26 fathoms, mud; Port Guatulco (195-D-20), 23 fathoms, mud; Tangola-Tangola Bay (196-D-17), 23 fathoms, mud; Costa Rica: Port Parker (203-D-1, 3), 12-15 fathoms, sandy mud, crushed shell, shelly mud.

Description: Shell small, subtrigonal, white, beaks subcentral and elevated; anterior dorsal margin sloping, anteriorly rounded and inflated, posterior dorsal margin steeply sloping, the end pointed, wedge-shaped, subcompressed; a well-developed and sunken lunular area and long escutcheon present; right valve with a broad flexure, the left with a shallow radial depression followed by an angulation; sculpture of fine, regular, concentric lamellae, about 3 or 4 per millimeter on adult shells; hinge of right valve with two strong cardinals, the posterior one grooved, and two laterals, left valve with a strong grooved anterior and weaker posterior cardinal, the latter close to the margin, the posterior cardinal in each valve grooved, pallial sinus high in the middle then descending near to but not touching the anterior adductor impression, then bending posteriorly and for about half its length confluent with the pallial line. Dimensions of the type: length, 9 mm.; height, 7.8 mm.; convexity (both valves together), 4.8 mm.

Holotype (Calif. Acad. Sci. Paleo. Type Coll.), from Loc. 20299 (C.A.S.), Magdalena Bay, Lower California, Mexico; Charles R. Orcutt collector. **Paratype**, from station 196-D-17, Lat. 15°45' N., Long. 96°05'34" W., Tangola-Tangola Bay, Mexico, dredged in 23 fathoms, mud.

One of the largest valves in the present collection measures 9.3 mm. in length. A large right valve dredged about 5 miles west of Mazatlan, Mexico, by the Templeton

⁴⁵ Salisbury, A. E., *Proc. Malacol. Soc. London*, Vol. 21, Pt. 2, July, 1934, p. 83.

⁴⁶ Dall, W. H., *Proc. U. S. Nat. Mus.*, Vol. 23, 1900, p. 302.

⁴⁷ *Tellina (Merisca) errati* Pilsbry & Johnson, *Proc. Acad. Nat. Sci. Philadelphia*, Vol. 69, May 5, 1917, p. 201. Santo Domingo, Oligocene [Miocene].—Pilsbry, *Proc. Acad. Nat. Sci. Philadelphia*, Vol. 73, Pt. 2, 1922, p. 425, pl. 41, fig. 7. [Figure of type].

⁴⁸ Maury, C. J., *Bull. Amer. Paleol.*, Vol. 5, No. 29, 1917, pp. 387 (223)-388 (224), pl. 64 (38), fig. 4.

⁴⁹ *Tellina (Merisca) sancti-dominici* Maury, *Bull. Amer. Paleol.*, Vol. 5, No. 29, Pt. 1, April 7, 1917, p. 388 (244), pl. 64 (38), fig. 11. "Bluff 3, Cercado de Mao." Santo Domingo, Miocene.

⁵⁰ *Tellina (Merisca) martensi* Lynge, *Kgl. Dansk. Vidensk. Skr.*, Ser. 7, Nat. og Math., Bd. 5, 1909, p. 195, pl. 3, figs. 40-42. "South of Koh Kut, 17-20 fathoms, mud (½)." Gulf of Siam. Singapore, 2-3 fathoms, coral reef; 5/2."

Crocker Expedition of the California Academy of Sciences in 1932, measures: length, 11.4 mm.; height, 9.8 mm.; convexity (one valve, 3 mm.

The use of the combination of names, *Tellina declivis* by Conrad, 1834, makes it necessary to propose a new name which is based on a new type specimen for the west American shell described under that name by Sowerby in 1868 which is here named *Tellina proclivis*.

The shell of *Tellina proclivis* differs from that of *T. reclusa* in the more steeply sloping dorsal margins, in lacking radial sculpture, in that the pallial sinus does not touch the anterior adductor impression and along the base it is confluent with the pallial line for only about one-half its length. It differs from *T. meropsis* in the more steeply sloping dorsal margins, more pointed posterior end and in the narrower, radially depressed area posteriorly.

Distribution: Specimens of this species, mostly single valves, were dredged by the expedition off western Mexico and Costa Rica in 12-26 fathoms, mostly on a mud bottom. Dall⁵¹ cited this species as occurring north to Catalina Island, California, but Burch⁵² indicated that it is questionable whether it is a member of the fauna of California.

Tellina (Merisca) reclusa Dall.

Tellina (Merisca) reclusa Dall, *Proc. U. S. Nat. Mus.*, Vol. 23, No. 1210, November, 1900, pp. 301, 315, pl. 3, fig. 2. "Types.—No. 105513, U. S. N. M., from San Ignacio Lagoon, Lower California, Hemphill. Also off Lower California, in lat. 30° 28', by the U. S. Fish Commission, at Station 3019, in 14 fathoms, Gulf of California."

Tellina reclusa Dall, E. K. Jordan, *Contrib. Dept. Geol. Stanford Univ.*, Vol. 1, No. 4, 1936, p. 145. Magdalena Bay and San Ignacio Lagoon, Lower California, Pleistocene. Recent from San Ignacio Lagoon to the Gulf of California.

Type Locality: San Ignacio Lagoon, Lower California.

Range: San Ignacio Lagoon, Lower California, to the Gulf of California and south to Bahia Honda, Panama.

Collecting Stations: Mexico: Arena Bank, Gulf of California (136-D-18, 21, 22), 40-45 fathoms, mud; Santa Inez Bay, Gulf of California (142-D-3; 145-D-1, 3), 4-40 fathoms, sand, weed; Port Guatulco (195-D-2, 3), 3-3.5 fathoms, sand, crushed shell, Tangola-Tangola Bay (196-D-14-15), 5 fathoms, crushed shell; Nicaragua: Corinto (200-D-8, 9), 6-6.6 fathoms, mangrove leaves, also on beach.

Description: Shell small, moderately convex, subtrigonal, posteriorly wedge-shaped and flexed, the posterior end keeled dorsally;

sculpture of fine, close (about 5 per mm.), little elevated, sharp, concentric lamellae which are separated by wider interspaces which are faintly, radiately striated; lunular area smooth, escutcheon long, narrow, deep; hinge normal for the subgenus; pallial sinus high behind then descending and usually, although not always, touching the base of the anterior adductor impression and wholly confluent with the pallial line below.

A specimen from Tangola-Tangola Bay, Mexico, measures: length, 20 mm.; height, 15.5 mm.; convexity (one valve), 3.6 mm.

Dall stated that "this species is notable for the rasp-like quality of its surface to the touch."

Compared to *Tellina proclivis* the shell of *T. reclusa* is longer in proportion to the height, the dorsal margins slope less steeply and the interspaces are ornamented by fine radial sculpture. The shell of *T. reclusa* is more elongate in outline but the posterior end is less attenuated and flexed and the concentric sculpture is more closely spaced than that of *T. crystallina*. The coarser sculpture and the fact that the pallial sinus usually touches the anterior adductor impression are features separating *T. reclusa* from *T. meropsis* Dall⁵³.

Tellina (Merisca) linteata Turton, which occurs in the Caribbean region from Florida to Brazil, is very similar to *T. reclusa*. *Pristipagia gemonia* Iredale,⁵⁴ an Australian species, also is a somewhat similar shell.

Distribution: This species was collected by the expeditions from Santa Inez Bay in the Gulf of California, to Corinto, Nicaragua, on the beach and dredged at depths of 3-45 fathoms. It is also known to occur in the Pleistocene of Lower California.

Subgenus *Scissula* Dall.

KEY TO THE SPECIES OF *Scissula*.

- A. Shell large, length exceeding 25 mm.
 - a. Posterior end obliquely truncated; white or tinged with brown... *cognata*
 - aa. Posterior end tapering and roundly pointed; pale rose color..... *nicoyana*
- B. Shell small, length not exceeding 25 mm.; very thin, glassy
 - a. Oblique striae widely spaced, coarse, very oblique..... *virgo*
 - aa. Oblique striae closer, finer, less oblique and approaching lines of growth..... *varilineata*⁵⁵

⁵⁵ Not represented in the present collection.

Tellina (Scissula) cognata C. B. Adams.

Tellina cognata C. B. Adams, *Ann. Lyceum Nat. Hist. New York*, Vol. 5, July, 1852, pp. 503, 545 (separate pp. 279, 321). "Habitat.—Panama."

⁵³ *Tellina (Moerella) meropsis* Dall, *Proc. U. S. Nat. Mus.*, Vol. 23, No. 1210, November, 1900, p. 317, pl. 3, fig. 1. "San Diego, California."

⁵⁴ *Pristipagia gemonia* Iredale, *Rec. Australian Mus.*, Vol. 19, No. 5, April 7, 1936, p. 281, pl. 21, fig. 6. "Habitat.—New South Wales. Type from Sydney Harbour."

⁵¹ *Arcopagia declivis* Sowerby, Dall, *U. S. Nat. Mus.*, Bull. 112, 1921, p. 45 (under section *Merisca*). Catalina Island, California, to Panama.

⁵² Burch, J. Q., *Min. Conch. Club South Calif.*, No. 45, 1945, p. 16.

Psammobia casta Reeve, Conch. Icon., Vol. 10, *Psammobia*, June, 1857, species 55, pl. 8, fig. 55. "Hab. Guatemala."

Not *Tellina casta* Hanley, Proc. Zool. Soc. London, September, 1844, p. 63. "Hab. Singapore; sandy mud."

Tellina tenuilineatus Li, Bull. Geol. Soc. China, Vol. 9, No. 3, October, 1930, p. 262, pl. 5, fig. 33. "Brought up by marine dredge from depths varying from 10. ft. to 40. ft. in the mud at the mouth of the Rio Grande near La Boca about one mile from the mainland in Panama Bay." "Horizon: Probably Gatun formation." According to Pilsbry this record is based upon "Two pieces of a left valve of '*Tellina cognata* C. B. Ad. Compared with Adams' type" (Proc. Acad. Nat. Sci. Philadelphia, Vol. 83, 1931, p. 431).

Type Locality: Panama.

Range: Mazatlan, Mexico, to Panama.

Collecting Stations: Guatemala: 7 miles west of Champerico (197-D-1, 2), 14 fathoms, mud; El Salvador: La Libertad (198-D-1, 2), 13-14 fathoms, mud; Meanguera Island, Gulf of Fonseca (199-D-1), 16 fathoms, sand, mud, crushed shell; Nicaragua: Monypenny Point, Gulf of Fonseca (199-D-4, 5, 6), 4-7 fathoms, mud; Costa Rica: 13 miles S. × E. of Judas Point (214-D-1), 42 fathoms, mud, shell; Panama: Gulf of Chiriqui (221-D-1-5), 35-40 fathoms, sandy mud.

Description: Shell oblong, anterior end obliquely rounded, posterior end obliquely truncated, gaping, a depressed posterior area is delimited by a rounded umbonal angulation, white or with a reddish or pale brownish tinge; sculpture consists of minute unequal radiating striae and concentric grooved striae which cross the lines of growth obliquely and become weak or absent on the posterior third of the shell; lateral teeth obsolete; pallial sinus highest posteriorly then descending gently and extending anteriorly for a little more than three-fourths the length of the shell but well separated from the anterior adductor impression; basally, for about one-half its length, it is confluent with the pallial line.

A specimen from the Gulf of Fonseca, in the present collection, measures: length, 45.3 mm.; height, 30 mm.; convexity (both valves together), 13.5 mm.; pallial sinus extends forward 36.4 mm. from the posterior end of the shell. A large left valve dredged in the Gulf of Chiriqui, Panama, measures: length, 49.5 mm.; height, 32 mm.; convexity (one valve), 7.5 mm.

This species is unlike any other along the Pacific Coast of the Americas. It bears only a general resemblance to the east American species *T. similis* Sowerby.

The present species appears to be referable to the subgenus *Scissula* Dall, 1900, type *Tellina decora* Say, rather than to other supraspecific groups in which the shell bears oblique striations such as *Scissulina* Dall, 1924, type, *T. dispar* Conrad; *Jactellina* Iredale, 1929, type, *T. obliquaria* Deshayes; *Obtellina* Iredale, 1929, type, *T. bougei*

Sowerby; and *Loxoglypta* Dall, Bartsch & Rehder, 1938, type, *T. obliquilineata* Conrad.

Distribution: This species was dredged by the expedition from Guatemala to Panama in 4-42 fathoms. It occurred rather abundantly off Champerico, Guatemala, in 14 fathoms, and in the Gulf of Chiriqui, Panama, in 35-40 fathoms, mostly on a muddy bottom. It also has been recorded as occurring in the Pliocene of Ecuador.

Tellina (Scissula) nicoyana Hertlein & Strong, sp. nov.

Plate I, Figs. 23, 24, 25, 26.

Shell elongately ovate, thin, gently inflated, nearly equilateral, color, pale rose; anterior dorsal margin slightly rounded, gently sloping anteriorly then rounding abruptly to the elliptically rounded anterior end which merges into the broadly rounded ventral margin; posterior end tapering, roundly pointed; the posterior dorsal margin slopes gently from the beaks with a convexity in the middle portion; the ornamentation consists of fine concentric lines of growth; these are crossed by oblique striae which begin on the anterior end and continue for about two-thirds the length of the shell but are absent on the posterior end where there are a few vague submicroscopic radiating striae; hinge of right valve with two grooved cardinals and, close by, an anterior lateral, and distally a posterior socket below which is a weak lateral; left valve with a grooved anterior cardinal and a thin lamella-like posterior cardinal, also a short anterior lateral or projection of the nymph and a faint posterior lateral; pallial sinus extending about four-fifths the length of the shell and separated from the anterior adductor impression by a considerable distance, high and rounded beneath the beaks then sloping and broadly undulating downward then turning abruptly downward to the pallial line with which it is confluent below; interior beautifully pale yellowish-rose and with faint submicroscopic radiating striae. Length, 34.4 mm.; height, 19 mm.; convexity (both valves together), 7.8 mm.; pallial sinus extends forward about 27 mm. from the posterior end of the shell.

Holotype and paratypes (Calif. Acad. Sci. Paleo. Type Coll.), dredged in Ballena Bay, Gulf of Nicoya, Costa Rica; also dredged in the same vicinity at Station 213-D-11, 17, in Lat. 9° 44' 52" to 9° 42' 00" N., Long. 84° 51' 25" to 84° 56' 00" W., in 35 fathoms, mud.

This beautiful species appears to be distinct from any described shell. It apparently has some characters in common with *Tellina delicatula* Deshayes⁵⁰, the type of which has never been illustrated, but differs in that the shell is nearly equilateral, rather than strongly inequilateral, and the hinge is quite different from that described by Deshayes. It also lacks the dark irregular lines crossing the oblique striae on that species mentioned

⁵⁰ *Tellina delicatula* Deshayes, Proc. Zool. Soc. London for 1854 (issued May 16, 1855), p. 363. "Hab. Mazatlan. Coll. Cuming."—Bertin, Nouv. Arch. Mus. Hist. Nat. (Paris), Ser. 2, Vol. 1, 1878, p. 290. Coast of Mazatlan.

by Carpenter⁵⁷. It is interesting to note that Maury has described *Tellina* (*Scissula*) *cercadica*⁵⁸ from the Miocene of Santo Domingo, which species, she stated, is very similar to a Recent shell from Panama Bay in the Newcomb collection which was labeled *Tellina delicatula* Deshayes. The Miocene shell illustrated by Maury is not at all similar to the present species but is more similar to *Tellina* (*Scissula*) *cognata* C. B. Adams from Panama.

Tellina (*Scissula*) *virgo* Hanley.

Tellina virgo Hanley, *Proc. Zool. Soc. London*, December, 1844, p. 143. "Hab. —? Mus. Cuming." "Allied to the *Iris* of Say, but much larger." —Hanley, *Thes. Conch.*, Vol. 1, 1846, p. 284, pl. 57, fig. 42. "Chiriqui, West Columbia." —Sowerby, *Conch. Icon.*, Vol. 17, *Tellina*, 1867, species 207, pl. 37, fig. 207. "Hab. Chiriqui, West Indies." —Pilsbry & Olsson, *Nautilus*, Vol. 56, No. 3, January, 1943, p. 79 (in text), pl. 8, fig. 5. Panama and west coast of northern South America to Puerto Pizarro, Peru.

Tellina (*Fabulina*) *virgo* Hanley, *Salisbury, Proc. Malacol. Soc. London*, Vol. 21, Pt. 2, July, 1934, p. 91, pl. 13, figs. 5 and 6. [Illustrations of holotype and paratype].

Type Locality: Chiriqui, west Panama (here designated as type locality). No locality cited originally.

Range: Magdalena Bay to the Gulf of California and south to Puerto Pizarro, Peru.

Collecting Stations: Nicaragua: Corinto (200-D-11-13, 15), 1-8 fathoms, mangrove leaves, also on beach.

Description: Shell small, ovately elongate, very thin, glassy, transparent, obtusely angulated posteriorly, colored pink or white; sculpture consists of fine striae which cross the shell obliquely but are absent on the posterior area; the pallial sinus projects anteriorly about four-fifths the length of the shell but does not quite touch the anterior adductor impression, along the base it is confluent with the pallial line.

One of the largest valves collected on the beach at Corinto, Nicaragua, measures: length, 20.2 mm.; height, 12 mm.; convexity (one valve), 2 mm.

The spacing of the oblique lines on this shell seems to vary somewhat but on the specimens which we have observed these lines are always more widely spaced and cross the shell at a greater inclination than those of the similar *Tellina* (*Scissula*) *varilineata* Pilsbry & Olsson⁵⁹.

Distribution: This species was collected by the expedition only at Corinto, Nicaragua, on the beach and dredged in 1 to 8 fathoms.

⁵⁷ Carpenter, P. P., *Cat. Mazatlan Shells*, September, 1855, p. 37.

⁵⁸ *Tellina* (*Scissula*) *cercadica* Maury, *Bull. Amer. Paleontol.*, Vol. 5, No. 29, Pt. 1, April 7, 1917, p. 388 (224), pl. 64 (38), fig. 9. "Bluff 3, Cercado de Mao." Santo Domingo, Miocene.

⁵⁹ *Tellina* (*Scissula*) *varilineata* Pilsbry & Olsson, *Nautilus*, Vol. 56, No. 3, January, 1943, p. 79, pl. 8, fig. 6. Type, "from Puerto Bucaro, Province of Los Santos, Panama." Also ranges south to Puerto Pizarro, Province of Tumbes, Peru.

Subgenus *Phyllodina* Dall.

Tellina (*Phyllodina*) *pristiphora* Dall.

Tellina (*Phyllodina*) *pristiphora* Dall, *Proc. U. S. Nat. Mus.*, Vol. 23, No. 1210, November, 1900, pp. 302, 316, pl. 4, fig. 14. "Dredged near La Paz, Lower California, in 26½ fathoms."

Tellina pristiphora Dall, Pilsbry & Lowe, *Proc. Acad. Nat. Sci. Philadelphia*, Vol. 84, 1932, p. 132. Dredged in 20 fathoms, Manzanillo; Acapulco, Mexico.

Type Locality: Near La Paz, Lower California, in 26½ fathoms.

Range: Santa Inez Bay, Gulf of California, to Puntarenas, Costa Rica.

Collecting Stations: Mexico: Arena Bank, Gulf of California (136-D-4, 7, 9, 15, 18, 20-22, 28, 32), 40-85 fathoms, mud, crushed shell, muddy sand, sand; Santa Inez Bay (146-D-1), 35 fathoms, mud, crushed shell; Manzanillo (184-D-2), 30 fathoms, gravelly sand; Port Guatulco (195-D-21), 18 fathoms, mud; Costa Rica: Port Parker (203-D-3), 12 fathoms, shelly sand.

Description: Shell of medium size, ovate, compressed, nearly equilateral, beaks low, anterior end rounded, posterior dorsal margin sloping, the end blunt, surface yellowish-white, somewhat chalky; sculpture consists of evenly spaced concentric lamellae which are separated by wider and finely concentrically striated interspaces, the lamellae are somewhat obsolete medially; on the posterior area, which on the right valve is set off by an angulation and on the left valve by a groove, the lamellae develop small squarish or rounded elevated foliations, along the anterior dorsal margin similar foliations present a serrated character; lunule and escutcheon elongate; two cardinal teeth in each valve, the right posterior and left anterior ones grooved, two large laterals in the right valve and two small ones in the left, the anterior ones closest to the cardinals; pallial sinus highest behind, then tapering, the end pointed, extending toward the anterior adductor impression for more than one-half the length of the shell, free and ascending from the pallial line except for a short distance posteriorly; interior white and in large specimens yellowish which becomes pale salmon in the anterior dorsal area.

A large specimen dredged on Arena Bank in the southern portion of the Gulf of California measures: length, 35.8 mm.; height, 23 mm.; convexity (both valves together), 10.2 mm.; pallial sinus extends forward 21.5 mm. from the posterior end of the shell.

Tellina fluctigera Dall⁶⁰, described from the Gulf of Panama, the type of which has not been illustrated, appears to be a very similar form.

Tellina dodona Dall and *T. leptalea* Gardner are representative of the subgenus *Phyllodina* in the Miocene of Florida.

⁶⁰ *Tellina* (*Phyllodina*) *fluctigera* Dall, *Bull. Mus. Comp. Zool.*, Vol. 43, No. 6, October, 1908, p. 419. Dredged "in the Gulf of Panama, in 182 fathoms, mud, bottom temperature 54° 1 F."

Distribution: Specimens of *Tellina pristi-phora* were dredged from Santa Inez Bay, in the Gulf of California, to Port Parker, Costa Rica, in 12-85 fathoms. The present record of occurrence at Costa Rica is an extension south of the known range of this species.

Subgenus *Phyllodella* Hertlein & Strong,
subgen. nov.

Shell elongate, compressed, moderately thin, equilateral, both sides sloping nearly equally, anterior end rounded, posterior end roundly obliquely truncated, a posterior area is set off by a weak posterior umbonal angulation; sculpture consists of fine close concentric threads which are crossed by fine radial striae; on the posterior area the concentric sculpture becomes squamose with fine plate-like scales; right valve with two grooved cardinals, a close anterior lateral and a small distant posterior lateral; left valve with a grooved anterior cardinal, a thin posterior cardinal and a weak anterior lateral, no posterior lateral; pallial sinus long, almost touching the anterior adductor impression, along the base wholly confluent with the pallial line.

The character of the hinge, the pallial sinus, and concentric sculpture anterior to the posterior angulation in this subgenus are similar to those of *Eurytellina*. The character of the posterior area, ornamented with squamose foliations, resembles that of *Phyllodina* Dall.

Tellina (*Phyllodella*) *insculpta* Hanley.

Tellina insculpta Hanley, *Proc. Zool. Soc. London*, September, 1844, p. 70. "Hab. Chiriqui, West Columbia; sandy mud, three fathoms." —Hanley, *Thes. Conch.* Vol. 1, 1846, p. 289, pl. 60, fig. 136. "Chiriqui, W. Columbia." —Sowerby, *Conch. Icon.*, Vol. 17, *Tellina*, 1867, species 208, pl. 37, fig. 208. "Hab. Chiriqui, West Columbia."

Type Locality: Chiriqui, west Panama, in three fathoms, sandy mud.

Range: Champerico, Guatemala, to Santa Elena Bay, Ecuador.

Collecting Stations: Guatemala: 7 miles west of Champerico (197-D-2), 14 fathoms, mud; El Salvador: La Libertad (198-D-1, 2), 13-14 fathoms, mud.

Description: Shell elongate, compressed, thin, white, equilateral, dorsal margins sloping, anterior end rounded, posterior end angulated; sculpture of fine, close, equidistant, concentric ribs (about 4 per mm.), both ribs and interspaces are crossed by fine submicroscopic radiating striae; posterior area set off by a weak angulation and on this area the surface is roughened by small scales or interrupted delicate lamellae; right valve with two grooved cardinals and an anterior lateral so closely situated near the beaks as to resemble a cardinal, and a small posterior lateral; left valve with a grooved anterior cardinal, a thin posterior cardinal and a faint anterior lateral; pallial sinus rather high

behind then descending, end blunt and almost, but not quite, touching the posterior basal margin of the anterior adductor impression, along the base it is confluent with the pallial line.

The largest specimen in the collection measures: length, 33.6 mm.; height, 18.3 mm.; convexity (both valves together), 5.8 mm.

The only other shell described from west American waters that bears much resemblance to this species appears to be *Tellina* (*Phyllodina*) *fluctigera* Dall, the type of which has not been illustrated. According to Dall's description the concentric sculpture of his species is more widely spaced (about 2 lamellae per mm. whereas there are about 4 per mm. in the present species) and the pallial sinus is entirely free from the pallial line rather than confluent with it.

Distribution: Specimens of *Tellina insculpta* were dredged by the expedition west of Champerico, Guatemala, in 14 fathoms, and at La Libertad, El Salvador, in 13 fathoms, on a muddy bottom. A small specimen of this species in the collections of the California Academy of Sciences was collected by Woodbridge Williams in Santa Elena Bay, Ecuador. These records extend the known range of the species both to the north and to the south.

Subgenus *Elliptotellina* Cossmann.

Tellina (*Elliptotellina*) *pacifica* Dall.

Tellina (*Elliptotellina*) *pacifica* Dall, *Proc. U. S. Nat. Mus.*, Vol. 23, No. 1210, November, 1900, pp. 302, 316, pl. 3, fig. 9. . . . "dredged in Panama Bay, in 18 fathoms, sand."

Type Locality: Panama Bay, in 18 fathoms, sand.

Range: Santa Inez Bay, in the Gulf of California, to the Bay of Panama.

Collecting Stations: Mexico: Santa Inez Bay, Lower California, in the Gulf of California (145-D-1-3), 4-13 fathoms, sand; Manzanillo (184-D-2), 30 fathoms, gravelly sand; Port Guatulco (195-D-9, 19), 7-17 fathoms, gr. mud, gr. sand, crushed shell; Tangola-Tangola Bay (196-D-6, 7), 6-7 fathoms, sand, crushed shell.

Description: Shell small, oval, both ends rounded, the anterior the longer, moderately convex, yellowish-white with a rose colored spot near each end of the hinge margin; sculpture of fine concentric grooves separated by wider interspaces, these on the posterior half (and sometimes faintly to the anterior third) of the shell are crossed by deep, angular, radial grooves which serrate the posterior ventral margin and between which are narrow interspaces; hinge of right valve with two cardinals, the anterior one a large subtriangular mass and the posterior one smaller and faintly grooved, two laterals present; left valve with two cardinals, the anterior one grooved, the laterals obsolete; pallial sinus ascending, extending anteriorly about one-half or more the length of the shell, rounded at the end and, except for a short

distance posteriorly, free from the pallial line.

A specimen from Tangola-Tangola Bay, Mexico, measures approximately: length, 7.8 mm.; height, 4.4 mm.; convexity (both valves together), 2.5 mm. A left valve from Port Guatulco, Mexico, measures 8.2 mm. in length.

This species differs from *Tellina americana* Dall, 1900, a similar east American species, in that the radial sculpture is stronger and is present farther anteriorly, the pallial sinus is longer and the color is said to be somewhat brighter.

Tellina cymobia Woodring⁶¹, described from the Miocene of Jamaica, is a very similar species.

Distribution: The discovery of the occurrence of *Tellina pacifica* in Santa Inez Bay in the Gulf of California is a long extension north of the known range of the species.

Genus *Tellidora* Mörch in H. & A. Adams.

Tellidora burneti Broderip & Sowerby.

Tellina burneti Broderip & Sowerby, *Zool. Jour.*, Vol. 4, No. 15, January, 1829, p. 362, pl. 9, fig. 2. "Hab. ad Mazatlan, in Aestuario." "Found in the Estuary of Mazatlan, among the shoals of large Pinnae which are left dry at low water." —Hanley, *Thes. Conch.*, Vol. 1, 1846, p. 271, pl. 58, fig. 99. "Salango, W. Columbia." —Sowerby, *Conch. Icon.*, Vol. 17, *Tellina*, 1867, species 199, pl. 35, figs. 199a, 199b. West Colombia. —M. Smith, *Panamic Shells* (Trop. Photogr. Lab., Winter Park, Florida), 1944, p. 65, fig. 843. Lower California to Ecuador.

Type Locality: Mazatlan, Mexico, in the estuary among shoals of large Pinnae at low water.

Range: Soledad, Lower California, to the Gulf of California and south to Salango, Ecuador.

Collecting Stations: Mexico: Port Guatulco (195-D-17), 6 fathoms, sand; El Salvador: Meanguera Island, Gulf of Fonseca (199-D-1), 16 fathoms, sand, mud, crushed shell; Nicaragua: Corinto, beach.

Description: Triangular, rather thin, inequivalve, subequilateral, compressed, subnacreous, white; the convex valve with obsolete distant dilated concentric grooves, which are most visible in front and towards the elevated acute and curving beaks (one of which projects over the other); the flat valve with the elevated fine rather irregular and close concentric striae, which become obsolete posteriorly; ventral edge arcuated; dorsal edges strongly sloping on either side, and armed with large tooth-like projections, the front one greatly incurved, the hinder nearly straight; ligament minute; dorsal slopes excavated; fold and flexure distinct; lateral teeth distinct, rather remote, and subequidistant. (Hanley, *Thes. Conch.*, Vol. 1, 1846, p. 271).

⁶¹ *Tellina* (*Elliplotellina*) *cymobia* Woodring, *Carnegie Inst. Washington, Publ.* 366, May 20, 1925, p. 174, pl. 24, figs. 14-16. Bowden, Jamaica, Miocene.

The pallial sinus is rather high and projects anteriorly more than half the length of the shell.

A large valve in the present collection from the Gulf of Fonseca, measures: length, 49 mm.; height, 40.5 mm.; convexity (one valve), approximately 3.4 mm.

There is some variation in the concentric sculpture of this species but the shape and ornamentation are so characteristic that it cannot be confused with any other west American shell.

Tellidora cristata Récluz⁶² is a similar species which occurs from Miocene to Recent in the Caribbean region. *Tellidora* (*Tellipiura*) *peruana* Olsson, 1944, has been described from the Cretaceous of Peru.

Distribution: This species was collected by the expedition off west Mexico, in the Gulf of Fonseca off El Salvador and at Corinto, Nicaragua. It also has been recorded as occurring in the Pleistocene at Magdalena Bay, Lower California, and Panama.

Genus *Macoma* Leach.

KEY TO THE SUBGENERA OF *Macoma*.

- A. Shell subtrigonal, beaks subcentral
 - a. Shell ornamented with slightly oblique corrugations; small; thin... *Cymatoica*
 - aa. Shell ornamented with concentric striae only *Macoma* s.s.
- B. Shell elongate, beaks posteriorly situated; posterior end much the shorter
 - a. Resilium internal and shorter than the ligament *Psammotreta*
 - aa. Resilium external and about as long as the ligament
 - b. Posterior area granulated *Macoploma*
 - bb. Posterior area not granulated *Psammacoma*

Subgenus *Macoma* s.s.

Macoma (*Macoma*) *nasuta* Conrad.

Tellina nasuta Conrad, *Jour. Acad. Nat. Sci. Philadelphia*, Ser. 1, Vol. 7, 1837, p. 258. "Inhabits coast of California near Sta. Diego."

Macoma nasuta Conrad, I. S. Oldroyd, *Stanford Univ. Publ. Univ. Ser. Geol. Sci.*, Vol. 1, 1924, p. 174, pl. 45, figs. 1a, 1b, 1c, 1d. Kodiak Island and Cook Inlet, Alaska, to Scammon Lagoon, Lower California. Also Miocene, Pliocene and Pleistocene of California. —Grant & Gale, *Mem. San Diego Soc. Nat. Hist.*, Vol. 1, 1931, p. 365, pl. 20, figs. 11a, 11b. Earlier records cited. ? Oligocene and Miocene to Recent.

⁶² *Lucina cristata* Récluz, *Rev. Zool., Soc. Cuvierienne*, 1842, p. 270. "Hab.: —Trouvée sur le banc de Campeche par M. Cosmao, commandant la station navale du Mexique." —Récluz, *Mag. de Zool.* (par Guérin-Méneville), 1843, Moll., pl. 60, p. 1, figs. 1-5. Original locality cited.

Tellina cristata Récluz, Sowerby, *Conch. Icon.*, Vol. 17, *Tellina*, 1868, species 291, pl. 49, figs. 291a, 291b. "Hab. —?" —M. Smith, *East Coast Mar. Shells* (Edwards Bros., Ann Arbor, Michigan), 1937, p. 60, pl. 54, figs. 6a, 6b. West Florida to Trinidad, West Indies.

Type Locality: Coast near San Diego, California.

Range: Kodiak Island and Cook's Inlet, Alaska, to Cape San Lucas, Lower California.

Collecting Station: Mexico: Cape San Lucas, Lower California.

Description: A single right valve of this well known strongly flexed shell, measuring 81 mm. in length and 42.8 mm. in height, was taken by the expedition at Cape San Lucas, Lower California.

The present specimen might be referable to *Macoma kelseyi* but it appears to be intermediate in characters between that form and *M. nasuta*. Dall described *Macoma kelseyi*⁶³ from the "Pleistocene" of San Diego, California.

It was said to differ from *M. nasuta* by its greater size, thicker, flatter shell and in that the pallial sinus in the right valve bends posteriorly before coalescing with the pallial line rather than joining it at a right angle. Study of a series of specimens of *Macoma nasuta* and of *M. kelseyi* reveals that there is some variation in the pallial sinus and it may be open to question whether *Macoma kelseyi* is a distinct species, subspecies, or merely a very large *M. nasuta*.

Distribution: The discovery of the occurrence of *Macoma nasuta* at Cape San Lucas, Lower California, is an extension south of the known range of the species. It also is known to occur as a fossil in California from Oligocene or Miocene to Recent.

Subgenus *Cymatoica* Dall.

Macoma (Cymatoica) undulata Hanley.

Tellina undulata Hanley, *Proc. Zool. Soc. London*, September, 1844, p. 72. "Hab. St. Elena, West Columbia; sandy mud, six fathoms."—Hanley, *Thes. Conch.*, Vol. 1, 1846, p. 310, pl. 59, figs. 107, 107*. "St. Elena, West Columbia."—Sowerby, *Conch. Icon.*, Vol. 17, *Tellina*, 1867, species 119, pl. 23, figs. 119a, 119b. "St. Elena, West Columbia."

Cymatoica occidentalis Dall, *Proc. U. S. Nat. Mus.*, Vol. 12, No. 773, 1889 (issued March 7, 1890), p. 272, pl. 10, fig. 11. Dredged "... in latitude 24° 18' N., longitude 110° 22' W., off the coast of Lower California, in 26½ fathoms, fine sandy mud."

Tellina (Cymatoica) undulata Hanley, Dall, *Proc. U. S. Nat. Mus.*, Vol. 23, No. 1210, 1900, p. 309. "Gulf of California, south to St. Elena, West Columbia."

Type Locality: Santa Elena, Ecuador, in 6 fathoms, sandy mud.

Range: Off the west coast of Lower California in Lat. 24° 18' N., Long. 110° 22' W., to the Gulf of California and south to Santa Elena, Ecuador.

Collecting Stations: Mexico: Santa Inez Bay, Gulf of California (145-D-1, 3), 4-13 fathoms, sand; Port Guatulco (195-D-19,

20), 17-21 fathoms, gr. mud, crushed shell, mud; Santa Cruz Bay (195-D-21), 18 fathoms, mud; Tangola-Tangola Bay (196-D-6, 7), 6-7 fathoms, sand, crushed shell; El Salvador: Meanguera Island, Gulf of Fonseca (199-D-1), 16 fathoms, sand, mud, crushed shell; Costa Rica: Port Parker (203-D-3), 12 fathoms, shelly mud.

Description: Shell small, thin, oblong, beaks subcentral, bluntly pointed and flexed to the right posteriorly, ornamented with small, rounded, undulating riblets which do not coincide with the incremental lines of growth except partially so on the posterior fold.

A right valve from the Gulf of Fonseca, measures: length, 16.4 mm.; height, 9 mm.; convexity (one valve), 2.6 mm.

Macoma orientalis Dall⁶⁴, described from the Antilles, is a very similar species.

Distribution: Specimens of this species were dredged from the Gulf of California to Costa Rica, in 4 to 21 fathoms.

Subgenus *Psammacoma* Dall.

KEY TO THE SPECIES OF *Psammacoma*.

- A. Shell moderately thick; telliniform
lamproleuca
- B. Shell thin; sometimes iridescent
 - a. Posterior end narrow; length usually not exceeding 35 mm.
 - b. Very narrow and thin *panamensis*
 - bb. Higher and thicker *spectri*
 - aa. Posterior end wide; length usually exceeding 35 mm. *elongata*

Macoma (Psammacoma) elongata Hanley.

Tellina elongata Hanley, *Proc. Zool. Soc. London*, December, 1844, p. 144. "Hab. Chiriqui [Chiriqui], West Columbia; in sand at three fathoms."—Hanley, *Thes. Conch.*, Vol. 1, 1846, p. 302, pl. 62, fig. 199. "Chiriqui, West Columbia."—Sowerby, *Conch. Icon.*, Vol. 17, *Tellina*, 1867, species 137, pl. 25, fig. 137. "Hab. Chiriqui, West Columbia."

Type Locality: Chiriqui, Panama, in 3 fathoms, sand.

Range: Lower California (Lat. 30° 36' N.) to Panama (Dall). Caribbean region (Dautzenberg).

Collecting Stations: Mexico: Santa Cruz Bay (195-D-21), 18 fathoms, mud; Acapulco (189-D-4), 28 fathoms, mud; El Salvador: Meanguera Island, Gulf of Fonseca (199-D-1), 16 fathoms, sand, mud, crushed shell; La Union (199-D-8-10, 12-14, 22), 3-6 fathoms, mud, mangrove leaves; Nicaragua: Monypenny Point (199-D-2-6), 4-7 fathoms, mud; Costa Rica: Cedro Island, Gulf of Nicoya (213-D-1,10), 8-10 fathoms, mud; 14 miles S. × E. of Judas Point (214-D-1, 4), 42-61 fathoms, mud, shell, rocks.

Description: Shell elongate, thin, smooth,

⁶³ *Macoma kelseyi* Dall, *Trans. Wagner Free Inst. Sci.*, Vol. 3, Pt. 5, December, 1900, p. 1052, pl. 49, fig. 7. "Pleistocene of San Diego, California, obtained in the City Park by Dr. R. E. C. Stearns." According to Dr. W. P. Woodring (oral communication), the type of this species came from Pliocene beds.

⁶⁴ *Cymatoica orientalis* Dall, *Proc. U. S. Nat. Mus.*, Vol. 12, 1889, No. 773, (issued March 7, 1890), p. 273, pl. 10, fig. 12. "Hab.—Samana Bay, Santo Domingo, in 16 fathoms, mud". . . . Also found at the same depth at Cardenas, Cuba.

white, sometimes iridescent outside, white within; anterior end rounded, posterior end produced and bluntly truncated; a submedian radial, depressed area present on the ventral half of the shell; ornamented with fine concentric lines of growth which are coarser along the posterior dorsal area, and along the posterior umbonal ridge there are faint irregular oblique striations that do not coincide with the lines of growth; hinge with two cardinals in each valve (on a large specimen the right anterior one sometimes somewhat roughened anteriorly), the posterior tooth slightly cleft, the left anterior cardinal slightly cleft, sometimes slightly indented at the base, on some specimens there are grooves along the margin back of the posterior tooth; pallial sinus higher behind and rounded in front, projecting forward about two-thirds the length of the shell and along the base for about half its length confluent with the pallial line.

A specimen dredged southwest of Maldonado Point, Mexico, measures approximately: length, 47.4 mm.; height, 25.5 mm.; convexity (both valves together), 13 mm.; pallial sinus extends forward 30 mm. from the posterior end of shell.

Tellina lamproleuca Pilsbry & Lowe is a somewhat similar species but the median depressed area is less developed, the shell is thicker and more telliniform and the posterior end is generally narrower.

Macoma gatunensis Toula, 1908, described from the Miocene Gatun beds at Panama, is very similar but is more excavated beneath the beaks. The shell illustrated by Olsson⁶⁵ under the name of *Macoma guatunensis* Toula appears to be very similar to the present species; in fact Olsson mentioned that he could detect no differences between the fossil form and Recent specimens of *M. elongata*. *Macoma falconensis* H. K. Hodson, described from the Miocene of Venezuela, also is a somewhat similar form as is *Macoma hosfordensis* Mansfield⁶⁶ which was described from the upper Miocene of Florida.

The posterior area of *Macoma elongata* is smooth in comparison to somewhat similar species assigned to *Macoploma* Pilsbry & Olsson in which the posterior area is ornamented with granules.

Distribution: Specimens of *Macoma elongata* were dredged by the expedition from off western Mexico to Costa Rica, in 3 to 61 fathoms, mostly on a muddy bottom. Dautenberg⁶⁷ cited this species as occurring at the island of St. Lucie in the West Indies and in the Gulf of Paria and Gulf of Maracaibo, Venezuela. We have not seen specimens from east American waters.

⁶⁵ Olsson, A. A., *Bull. Amer. Paleo.*, Vol. 5, No. 39, Pt. 2, June 21, 1922, pl. 29 (26), fig. 13. Banana River, Costa Rica. Miocene.

⁶⁶ *Macoma (Psammacoma) hosfordensis* Mansfield, *Florida Geol. Surv.*, Bull. 8, 1932, p. 142, pl. 30, figs. 6, 10, 12, 13. "Type locality: Station 3671, 2 miles north of Hosford, Liberty County, Fla." Choctawhatchee, upper Miocene.

⁶⁷ Dautenberg P., *Mem. Zool. Soc. France*, Vol. 13, 1900, p. 263.

***Macoma (Psammacoma) lamproleuca* Pilsbry & Lowe.**

Tellina lamproleuca Pilsbry & Lowe, *Proc. Acad. Nat. Sci. Philadelphia*, Vol. 84, May 21, 1932, p. 93, pl. 11, figs. 6 and 7. "Corinto, Nicaragua." Also Panama.

Macoma parthenopa Pilsbry & Lowe, *Proc. Acad. Nat. Sci. Philadelphia*, Vol. 84, May 21, 1932, p. 144, pl. 11, figs. 6 and 7. "Corinto," type. Also Panama.

Macoma lamproleuca Pilsbry & Lowe, Pilsbry & Olsson, *Proc. Acad. Nat. Sci. Philadelphia*, Vol. 93, 1941, p. 69. Jama formation, Puerto Jama, and Canoa formation, Punta Blanca, Ecuador, Pliocene. Also Recent from Panama to Zorritos, Peru.

Type Locality: Corinto, Nicaragua.

Range: Santa Inez Bay, Gulf of California, to Zorritos, Peru.

Collecting Stations: Mexico: Santa Inez Bay, Gulf of California (142-D-4), 40-50 fathoms, sand; Guatemala: 7 miles west of Champerico (197-D-1, 2), 14 fathoms, mud; El Salvador: La Libertad (198-D-1, 2), 13-14 fathoms, mud; Meanguera Island (199-D-1), 16 fathoms, sand, mud, crushed shell.

Description: Shell elongate, telliniform, fairly thick, white under a buff periostracum, somewhat inequilateral, the anterior end the longer, dorsal margins sloping and nearly straight, anterior end broadly rounded, posterior end bluntly truncated; surface ornamented with irregular lines of growth and wrinkles, stronger on the posterior area; sometimes in the right sometimes in the left valve the posterior area bears a median radial depression; a medial flattening from the umbos to the ventral margin often present; lunular area lanceolate and concave; hinge with two cardinals in each valve, the right posterior and left anterior ones bifid, no laterals present; the pallial sinus extends about four-sevenths the length of the shell, it is usually higher in the middle, rounded at the end and joins the pallial line at an acute angle and for a little over half its length is confluent with the pallial line.

The largest specimen in the present collection, a left valve, measures: length, 72.8 mm.; height, 40.5 mm.; convexity (one valve), 10.5 mm.; pallial sinus extends forward 41 mm. from posterior end of shell.

The shell of this species is similar to that of *Macoma elongata* but the dorsal margins slope more steeply, especially anteriorly, the posterior extremity is usually narrower, the shell is thicker and the hinge is heavier.

Macoma falconensis H. K. Hodson⁶⁸, described from the Miocene of Venezuela, is a similar species.

Distribution: This species was taken off Guatemala and El Salvador in 13 to 16 fathoms, usually on a muddy bottom. It also has

⁶⁸ *Macoma (Psammacoma) falconensis* H. K. Hodson, *Bull. Amer. Paleo.*, Vol. 16, No. 59, October 1, 1931, p. 16, pl. 6, figs. 1, 6, 7. "Holotype Locality—5 kilometers north and 350 meters west of Urumaco, in Rio Codore, District of Democracia, Falcón." Venezuela. Miocene. Also other localities.

been recorded as occurring in the Pliocene of Ecuador.

***Macoma (Psammacoma) panamensis* Dall.**

Macoma (Psammacoma) extenuata var. ? *panamensis* Dall, *Proc. U. S. Nat. Mus.*, Vol. 23, No. 1210, November, 1900, p. 310. "Panama."

Macoma (Psammacoma) panamensis Dall, *Proc. U. S. Nat. Mus.*, Vol. 23, No. 1210, November, 1900, p. 324, pl. 4, fig. 3. . . . "dredged in 33 fathoms, sand, in Panama Bay."

Type Locality: Panama Bay, in 33 fathoms, sand.

Range: Gulf of California to Panama.

Collecting Stations: Mexico: Tenacatita Bay (183-D-3), 40 fathoms, sandy mud; 4 miles SSW. of Maldonado Point (192-D-3), 38 fathoms, mud; Tangola-Tangola Bay (196-D-18), 30 fathoms, mud; Costa Rica: Port Parker (203-D-3), 12 fathoms, shelly mud; 14 miles S. × E. of Judas Point (214-D-1, 4), 42-61 fathoms, mud, shell, rocks; Panama: Gulf of Chiriqui (221-D-1, 5), 35-40 fathoms, sandy mud.

Description: Shell very elongated, slender, thin, moderately convex, right valve slightly flattened posterior to the center, inequilateral, the anterior end the longer, posterior end produced and subrostrate, yellowish-white; ornamented with fine concentric striae which are heavier on the posterior area; hinge with two teeth in each valve, the right posterior and left anterior ones cleft; pallial sinus rounded at the anterior end which projects forward about five-eighths the length of the shell, and for about one-half its length confluent with the pallial line; interior of valves sometimes show obscure striations near the margins.

A right valve from the Gulf of Chiriqui, Panama, measures: length, 31 mm.; height, 14.4 mm.; convexity (one valve), 3.5 mm.; pallial sinus extends forward 20 mm. from the posterior end of the valve.

Macoma extenuata Dall,⁶⁹ described from the Gulf of Mexico, is a very similar species. *Macoma panamensis canalis* Olsson, described from the Miocene of the Canal Zone, is higher in proportion to the length.

Compared to *Macoma elongata* Hanley, the shell of *M. panamensis* is generally narrower and more elongate and the posterior end is narrower.

Distribution: This species was dredged by the expedition from off Mexico to the Gulf of Chiriqui, Panama, in 12-61 fathoms, mostly on a muddy or sandy mud bottom.

Macoma (Psammacoma) panamensis spectri

Hertlein & Strong subsp. nov.

Plate I, Figs. 9, 10, 16.

Shell elongate, fairly thick, white, some-

what flexed posteriorly; left valve moderately inflated, the right flattened a little posterior to the middle; posterior dorsal margin sloping, anterior end the longer, the dorsal margin slightly convex and gently sloping, that of the right overlapping the left for about a third of its length; anterior end well rounded, ventral margin only slightly curved, posterior end produced, roundly truncated, on each valve a distinct angulation extending from near the beaks to the lower end of the truncation; exterior surface showing distinct resting stages between which there are many very fine concentric striations and microscopic radial striae most distinct just anterior to the posterior angulation; fresh specimens are often iridescent; interior shining white; two cardinal teeth in each valve, the right posterior and left anterior ones bifid, lateral teeth lacking; pallial sinus subangulate above, highest at a point nearly vertically below the beaks, end elliptically rounded and extending forward about two-thirds the length of the shell and along the base for more than half its length confluent with the pallial line. Holotype, a left valve, measures: length, 34.4 mm.; height, 18.5 mm.; convexity, 5.3 mm.; pallial sinus extends anteriorly 21.5 mm. from the posterior end of the shell.

Holotype, left valve, and paratype, a right valve (Calif. Acad. Sci. Paleo. Type Coll.), dredged in Santa Inez Bay, Gulf of California, Station 143-D-3, Lat. 26° 57' N., Long. 111° 56' W., in 35 fathoms (64 meters), mud, crushed shell.

Three additional specimens were dredged at the same locality. Other specimens were dredged in the same general area in Santa Inez Bay at Station 143-D-1, 4, in 25-29 fathoms, mud, crushed shell, weed, sand; specimens were dredged on Arena Bank, Gulf of California, at Station 136-D-2, 45 fathoms, mud, *Arca* conglomerates. About a dozen single valves, probably from the Gulf of California, are without information as to locality. One valve from the Gulf of Chiriqui, Panama, Station 221-D-1-5, 35-40 fathoms, sandy mud, appears to belong to this subspecies.

The growth lines of these specimens are so fine that when fresh specimens are examined at an angle they act as a grating and produce beautiful iridescent spectral colors.

The shell here described as a new subspecies is similar to that of *Macoma panamensis*, but it is higher in proportion to the length and so far as known it is generally restricted to a more northern range. Some young specimens are very similar to Dall's species and perhaps additional specimens may show the form here described as new to be without significance, but the greater height, iridescent color and generally more northern distribution appear, at the present time, to be sufficient reasons for separating it as a distinct subspecies.

This new subspecies is very similar to

⁶⁹ *Macoma (Psammacoma) extenuata* Dall, *Proc. U. S. Nat. Mus.*, Vol. 23, No. 1210, November, 1900, p. 314, pl. 2, fig. 7. Dredged "between the delta of the Mississippi and Cedar Keys, Florida, in 32 fathoms, sand." Cited on p. 300 as "*Macoma (Cydippina) extenuata*."

Macoma panamensis canalis Olsson,⁷⁰ described from the Miocene Gatun beds of Panama, which also is higher in proportion to the length as compared to *M. panamensis*. The shell of the present subspecies is higher and a little less elongate than Olsson's subspecies. Furthermore adult shells are moderately thick whereas those of Olsson's subspecies were described as very thin and fragile.

Subgenus *Psammotreta* Dall.

KEY TO THE SPECIES OF *Psammotreta*.

- A. Umbos orange-red; shell subrectangular, narrow *aurora*
 B. Umbos white shading to ochraceous; shell proportionately larger and higher *pacis*

Macoma (Psammotreta) aurora Hanley.

Tellina aurora Hanley, *Proc. Zool. Soc. London*, December, 1844, p. 147. "Hab. Panama; soft sandy mud, ten fathoms: Cuming."—Hanley, *Thes. Conch.*, Vol. 1, 1846, p. 301, pl. 58, fig. 76. Panama.

Macoma (Psammacoma) aurora Hanley, Salisbury, *Proc. Malacol. Soc. London*, Vol. 21, Pt. 2, July, 1934, p. 91, pl. 11, fig. 4. Figure of lectotype.

Type Locality: Panama, in 10 fathoms, soft sandy mud.

Range: Gulf of California to Boca de Pan, Peru.

Collecting Stations: Mexico: Santa Cruz Bay (195-D-21), 18 fathoms, mud; Tangola-Tangola Bay (196-D-14, 15), 5 fathoms, crushed shell; Nicaragua: Corinto (200-D-8, 9), 6-6.6 fathoms, mangrove leaves.

Description: Shell elongate, longer anteriorly, the end rounded, posterior end bluntly truncated, posterior area set off by an umbonal angulation; resilium internal and partly separated from the ligament; shell white or yellowish-white with the umbonal area both exteriorly and interiorly ornamented with orange red which grades into yellow anteriorly; two cardinals in each valve, the right posterior and left anterior ones faintly cleft; on some large right valves there is a small denticle-like projection of the nymph at the ventral end of the resilium; the pallial sinus extends forward about two-thirds the length of the shell to the anterior edge of the orange red area but is separated from the anterior adductor impression by considerable space; along the base for about half its length it is confluent with the pallial line.

A left valve of this species from Tangola-Tangola Bay, Mexico, in the present collection, measures 28 mm. in length. A specimen from Panama in the collections of the California Academy of Sciences, measures: length, 27.5 mm.; height, 17.3 mm.; convexity (both valves together), 8.2 mm.; pallial

sinus extends forward 19 mm. from the posterior end of the shell.

The elongate, subrectangular form and orange red radial area on the umbonal region are characteristic features of this *Macoma*.

Macoma hesperus Dall,⁷¹ an unfigured species described from the Gulf of Panama, was said to bear a resemblance to *M. aurora* but with a narrower shell and a different hinge.

Distribution: A few specimens of this species were dredged in 5-18 fathoms off west Mexico and Corinto, Nicaragua.

Macoma (Psammotreta) pacis Pilsbry & Lowe.

Macoma pacis Pilsbry & Lowe, *Proc. Acad. Nat. Sci. Philadelphia*, Vol. 84, May 21, 1932, p. 95, pl. 10, figs. 1, 1a, 2, 3. "La Paz, Lower California."

Type Locality: La Paz, Lower California.
Range: Gulf of California to Golfito, Gulf of Dulce, Costa Rica.

Collecting Stations: Mexico: Port Gualtulo; Guatemala: 7 miles west of Champerico (197-D-2), 14 fathoms, mud; Costa Rica: Cedro Island, Gulf of Nicoya; Golfito.

Description: Shell resembling that of *Macoma aurora* but larger and higher in proportion to the length, usually whiter and tinted with yellow and on some specimens the umbonal area is of an ochraceous salmon color. Two cardinal teeth in each valve, the right posterior and left anterior ones bifid, the left posterior cardinal narrow and near the posterior margin; pallial sinus high beneath the beaks then descending to a bluntly rounded end and for about half its length confluent with the pallial line.

A specimen in the present collection from Golfito, Costa Rica, measures: length, 34.6 mm.; height, 21.8 mm.; convexity (both valves together), 9.9 mm. A large right valve from Cedro Island in the Gulf of Nicoya, measures: length, 52.6 mm.; height, 34 mm.; convexity (one valve), 6.6 mm.; pallial sinus extends forward 35 mm. from the posterior end of the shell.

Small specimens of this species are very similar to those of *Macoma aurora* but seem to differ constantly in the particular mentioned above. As pointed out by Pilsbry & Lowe the relation of height to length varies considerably in different specimens.

Illustrations of *Macoma plebeia* Hanley⁷² indicate a shell which is more roundly oval with a more rounded ventral margin posteriorly. According to the illustration of that species given by Pilsbry & Lowe the pallial sinus is more broadly rounded at the end and is confluent with the pallial line for a shorter distance than that of *Macoma pacis*.

⁷¹ *Macoma (Psammacoma) hesperus* Dall, *Bull. Mus. Comp. Zool.*, Vol. 43, No. 6, October, 1908, p. 421. Dredged in the "Gulf of Panama, in 182 fathoms, mud, bottom temperature 54° 1 F."

⁷² *Tellina plebeia* Hanley, *Proc. Zool. Soc. London*, December, 1844, p. 147. "Hab. Real Lejos, Central America; sandy mud, seven fathoms."—Hanley, *Thes. Conch.*, Vol. 1, 1846, p. 299, pl. 60, fig. 151. Original locality cited. [Not pl. 59, fig. 129, "Senegal".]

Macoma plebeia Hanley, Pilsbry & Lowe, *Proc. Acad. Nat. Sci. Philadelphia*, Vol. 84, 1932, p. 95 (in text), pl. 10, fig. 5. "Real Lejos (= Corinto)."

⁷⁰ *Macoma panamensis* Dall var. *canalis* Olsson, *Bull. Amer. Paleol.*, Vol. 9, No. 39, Pt. 2, June 21, 1922, p. 429 (257), pl. 29 (26), fig. 11. "Gatun Stage; Mt. Hope, C. Z."

Macoma mazatlanica Deshayes⁷³ is very similar to *M. pacis* but is more tapering posteriorly.

Distribution: Specimens of *Macoma pacis* were taken by the expedition off west Mexico, Guatemala and Costa Rica. This is an extension south of the known range of the species.

Subgenus *Macoploma* Pilsbry & Olsson.

Macoma (Macoploma) medioamericana Olsson.

Macoma (Macoploma) medioamericana Olsson, *Bull. Amer. Paleol.*, Vol. 27, No. 106, December 25, 1942, p. 196 (44), pl. 17 (4), fig. 8. "Pliocene. Quebrada Peñitas, Costa Rica."

Type Locality: Quebrada Peñitas, Costa Rica. Pliocene.

Range: Arena Bank, Gulf of California, to Panama.

Collecting Stations: Arena Bank, Gulf of California (136-D-21), 45 fathoms, mud; El Salvador: La Libertad (198-D-2), 16 fathoms, mud; Costa Rica: off Ballena Bay, Gulf of Nicoya (213-D-11-17), 35-40 fathoms, mud.

Description: Shell elongate, moderately thin, general characters much like those of *Macoma elongata* but with the anterior dorsal margin more steeply sloping and with the posterior area ornamented with strong concentric laminae and earthy granules.

The largest specimen in the collection from the Gulf of Nicoya, measures approximately: length, 101 mm.; height, 54 mm.; convexity (both valves together), 24 mm.

Some of the specimens in this collection agree so closely with Olsson's description and illustration of *Macoma medioamericana* that we have referred them to his species. There is variation in the specimens and some might be equally well referred to *Macoma (Macoploma) ecuadoriana* Pilsbry & Olsson⁷⁴ described from the Pliocene of Ecuador. According to Olsson, *M. medioamericana* is proportionately longer and has coarser and more earthy granulations on the posterior submargins in comparison to *M. ecuadoriana*.

It is obvious from a study of a series of specimens that there are several very closely related variable species, including *Macoma elongata*, *M. panamensis*, *M. lamproleuca*, *M. ecuadoriana* and *M. medioamericana*. The presence of granulation on the posterior areas appears to be the only certain criterion separating the species of *Macoploma* from some of the others. The granules are present on specimens in the present collection after they have attained a length of about 20 to 25 mm. It is very difficult to separate specimens of a smaller size from those of *M. elongata* or *M. lamproleuca*.

⁷³ *Tellina mazatlanica* Deshayes, *Proc. Zool. Soc. London* for 1854 (issued May 16, 1855), p. 359. "Hab. Mazatlan. Coll. Cuming."—Sowerby, *Conch. Icon.*, Vol. 17, *Tellina*, October, 1868, species 320, pl. 54, fig. 320. "Hab. Mazatlan. Coll. Cuming."

⁷⁴ *Macoma (Macoploma) ecuadoriana* Pilsbry & Olsson, *Proc. Acad. Nat. Sci. Philadelphia*, Vol. 93, September 9, 1941, p. 69, pl. 19, fig. 5. "Canoa formation, Punta Blanca." Ecuador, Pliocene.

Distribution: Specimens of this species were dredged by the expedition at depths of 16 to 45 fathoms from Arena Bank, Gulf of California, La Libertad, El Salvador, and off Costa Rica in the Gulf of Nicoya, mostly on a muddy bottom. The species also is known to occur in the Pliocene of Costa Rica. The present records of occurrence reveal for the first time that this species is living at the present time in west American waters.

Genus *Apolymetis* Salisbury.

KEY TO THE SPECIES OF *Apolymetis*.

- A. Posterior end broadly rounded
 a. Shell thick, hinge broad...*biangulata*⁷⁵
 aa. Shell thin, hinge narrow*cognata*
 B. Posterior end tapering, truncated
 a. Hinge fairly broad; anterior adductor impression elongately oval; pallial sinus for a little less than half its length confluent with pallial line*dombei*
 aa. Hinge very narrow; anterior adductor impression very long and narrow; pallial sinus confluent with pallial line for only a very short distance
*asthenodon*⁷⁵

Apolymetis cognata Pilsbry & Vanatta.

Lutricola cognata Pilsbry & Vanatta, *Proc. Washington Acad. Sci.*, Vol. 4, September 30, 1902, p. 556, pl. 35, fig. 5. "From Tagus Cove, Albemarle." Galápagos Islands.

Apolymetis cognata Pilsbry & Vanatta, Pilsbry & Lowe, *Proc. Acad. Nat. Sci. Philadelphia*, Vol. 84, 1932, pp. 96 (in text), 133. Galápagos Islands, also Taboga Island, Panama, and Corinto, Nicaragua.

Type Locality: Tagus Cove, Albemarle Island, Galápagos Islands.

Range: Magdalena Bay, Lower California, to Paita, Peru.

Collecting Station: Nicaragua: Corinto (200-D-19), 12-13 fathoms, mangrove leaves.

Description: Shell rounded-quadrate, moderately compressed, bent to the right posteriorly, rather thin, gray white. Sculptured with irregular growth wrinkles and low radial striae, covered with an extremely minute secondary radial striation. Beaks median, worn at the tip. Anterior margin rounded; posterior margin subtruncate, the basal margin straightened, sinuous; pallial sinus ample. Length of left valve, 41 mm., alt. 34 mm., diameter 8 mm. (Original description).

Closely related to *L. alta* Conr., but higher, shorter, of a more quadrate shape. The anterior end of the pallial sinus is more rounded, and its upper margin is not sinuous. *L. excavata* Sowb. is a more wedge-shaped shell (Pilsbry & Vanatta).

This species differs from the generally more northern *A. biangulata* Carpenter in the much narrower, weaker hinge, in the more flaring and less steeply sloping posterior area, and in the generally thinner shell.

⁷⁵ Not represented in the present collection.

Specimens referable to the present species from the Gulf of California and southward have in some instances, formerly been referred to "*Tellina excavata* Sowerby⁷⁶ which was originally described without information as to locality. As pointed out by Pilsbry & Vanatta the illustration given by Sowerby indicates a shell with the posterior end wedge-shaped. Pilsbry & Lowe later pointed out that there seemed to be no characters by which "*Tellina excavata* could be separated from *Apolymetis dombei* Hanley. They recognized only four west American species of the genus, *Apolymetis alta* Conrad [= *biangulata* Carpenter], *A. asthenodon* Pilsbry & Lowe, *A. cognata* Pilsbry & Vanatta and *A. dombei* Hanley. However for some unexplained reason, probably an oversight, they cited (p. 195) *A. excavata* Sowerby from Mazatlan, Mexico. In later publications, Lowe⁷⁷ cited "*Metis excavata* Sowerby" as occurring at Punta Penasco, Mexico, in the Gulf of California, and Pilsbry & Olsson⁷⁸ recorded "*Apolymetis excavatus* Sowerby" from the Pliocene of Ecuador. No illustrations were given of the shells representing those records so we are uncertain which species was represented. Specimens from the coast of the mainland appear to be identical with those from the Galápagos Islands, the type locality of *A. cognata*.

Distribution: A single small right valve of this species, measuring about 20 mm. in length, was taken by the expedition at Corinto, Nicaragua, in 12-13 fathoms.

Apolymetis dombei Hanley.

Tellina dombei Hanley, *Proc. Zool. Soc. London*, December, 1844, p. 144. "Hab. Panama; twelve fathoms, sandy mud."—Hanley, *Thes. Conch.*, Vol. 1, 1846, p. 323, pl. 62, fig. 182. Panama. Variety, pl. 64, fig. 222. Tumbez, Peru.

Tellina dombeyi Hanley, *Proc. Zool. Soc. London* for 1844 (issued February, 1845), p. 195 (index).—Sowerby, *Conch. Icon.*, Vol. 17, *Tellina*, 1867, species 169, pl. 30, fig. 169. "Hab. Panama, Tumbez, Peru."—Römer, *Syst. Conchyl.-Cab. von Martini und Chemnitz*, Bd. 10, Abt. 4, *Tellina*, 1871, p. 205, pl. 39, figs. 7-9. Various localities cited from the Gulf of California to Tumbez, Peru.

Psammobia sp., Li, *Bull. Geol. Soc. China*, Vol. 9, No. 3, 1930, p. 262, pl. 5, fig. 32. Dredged in Panama Bay in 10-40 ft. "Probably Gatun formation." Pilsbry (*Proc. Acad. Nat. Sci. Philadelphia*, Vol. 83, 1931, p. 431) stated that Li's record was based on "A good but bleached valve of *Apolymetis dombei* (Hanley)."

Type Locality: Panama, in 12 fathoms, sandy mud.

Range: Gulf of Fonseca to Tumbez, Peru.
Collecting Stations: Nicaragua: Potosi

and 5 miles SSW. of Monypenny Point, Gulf of Fonseca, beach; Costa Rica: 1 mile S. of entrance to Golfito Bay, Gulf of Dulce, beach.

Description: Shell ovately subtriangular, moderately thick, rather smooth, white but often with umbonal area reddish-orange exteriorly and sometimes interiorly; the anterior end the longer, rounded and somewhat obliquely produced; a flexure or depressed radial area is present anterior to the posterior umbonal ridge; posterior end sloping, subtriangular and subtruncated, area set off by an umbonal angulation; hinge with two cardinals, the right posterior bifid, the left anterior grooved, no laterals present; the pallial sinus is high and subangulate in the middle then sloping down even with but well separated from the anterior adductor impression and for a little less than one-half its length confluent with the pallial line.

The shell of this species is somewhat variable in outline. Some specimens agree almost exactly with Hanley's original figure, others are more trigonal. A large right valve from the Bay of Panama in the collections of the California Academy of Sciences, measures: length, 66 mm.; height, 51 mm.; convexity (one valve), 14 mm.

Römer, 1871, and Stearns, 1891, pointed out the resemblance between "*Tellina dombei* and "*Tellina excavata* Sowerby⁷⁹ which was described without information as to the locality from which it came. Later Pilsbry & Lowe, 1932, stated that they knew of no difference separating these two species.

Compared to *Apolymetis dombei*, *A. asthenodon* Pilsbry & Lowe⁸⁰ was described as possessing a more elongate shell with a very narrow hinge, a narrower, longer anterior adductor impression. Judging from the illustrations, the pallial sinus is confluent with the pallial line for a very short distance if at all.

The shell of *Apolymetis dombei* differs from that of *Macoma grandis* Hanley⁸¹ which was originally described from Tumbez, Peru, and was taken at Corinto, Nicaragua, by the Templeton Crocker Expedition, 1932, in the stronger, broader, posterior umbonal fold and much longer pallial sinus. Judging from the illustration of *Macoma gubernaculum* Hanley,⁸² originally described from Real

⁷⁹ *Tellina excavata* Sowerby, *Conch. Icon.*, Vol. 17, *Tellina*, March, 1867, species 138, pl. 26, fig. 138. "Hab. —?"

Soot-Ryen (*Nyt. Mag. for Naturvid.*, Bd. 70 (Meddel. Zool. Mus. Oslo, No. 27), 1932, p. 321, pl. 2, fig. 10) illustrated a shell under the name of *Apolymetis excavata* Sowerby from Floreana (Charles) Island, Galápagos group. He remarked on the variability of the outer form revealed by different specimens, some of which were elongated, other shorter and higher.

⁸⁰ *Apolymetis asthenodon* Pilsbry & Lowe, *Proc. Acad. Nat. Sci. Philadelphia*, Vol. 84, May 21, 1932, p. 96, pl. 11, figs. 1-3. "Panama, on the beach (D. E. Harrower, J. Zetek)." Type. Also at La Union, Gulf of Fonseca, El Salvador.

⁸¹ *Tellina grandis* Hanley, *Proc. Zool. Soc. London*, December, 1844, p. 141. "Hab. Tumbez, Peru."—Hanley, *Thes. Conch.*, Vol. 1, 1846, p. 327, pl. 65, fig. 247. Tumbez, Peru.

⁸² *Tellina gubernaculum* Hanley, *Proc. Zool. Soc. London*, December, 1844, p. 142. "Hab. Real Llejos, Central America; in sandy mud, seven fathoms."—Hanley, *Thes. Conch.*, Vol. 1, 1846, p. 325, pl. 62, fig. 186. "Real Lejos, Central America (Cuming)."

⁷⁶ *Tellina excavata* Sowerby, *Conch. Icon.*, Vol. 17, *Tellina*, March, 1867, species 138, pl. 26, fig. 138. "Hab. —?"

⁷⁷ Lowe, H. N., *Trans. San Diego Soc. Nat. Hist.*, Vol. 8, No. 6, 1935, p. 28.

⁷⁸ Pilsbry, H. A., and Olsson, A. A., *Proc. Acad. Nat. Sci. Philadelphia*, Vol. 93, 1941, p. 70.

Llejos, Nicaragua, the anterior dorsal margins slope more abruptly than those of *A. dombei*.

Distribution: Specimens of *Apolymetis dombei* were taken by the expedition on the beaches in the Gulf of Fonseca, Nicaragua, and Gulf of Dulce, Costa Rica. We have not seen specimens from north of Nicaragua. It has been reported as ranging south to Peru. It also has been recorded as occurring in beds of upper Pliocene age in the Galápagos Islands. "*Apolymetis* cf. *A. dombei* (Hanley)" has been cited by Stewart⁸³ as occurring in upper Pliocene beds in the Kettleman Hills, San Joaquin Valley, California.

Genus *Strigilla* Turton.

KEY TO THE SPECIES OF *Strigilla*.

- A. Shell equilateral; small, white.....*lenticula*
 B. Shell inequilateral, elongated posteriorly
 a. Striae much more widely spaced anteriorly*cicercula*
 aa. Striae equally or more closely spaced anteriorly
 b. Shell thick; convex; roundly truncated anteriorly*costulifera*
 bb. Shell thin; flatter; expanded anteriorly*disjuncta*

Strigilla cicercula Philippi.

Plate I, Fig. 19.

Tellina cicercula Philippi, *Zeit. f. Malakozool.*, Jahrg. 3, February, 1846, p. 19. "Patria: Mazatlan."

Tellina dichotoma Philippi, *Zeit. f. Malakozool.*, Jahrg. 3, February, 1846, p. 20. "Patria: Mazatlan."

Tellina ervilia Philippi, *Zeit. f. Malakozool.*, Jahrg. 3, February, 1846, p. 20. "Patria: Mazatlan."

Strigilla maga Mörch, *Malakozool. Blätter*, Bd. 7, December, 1860, p. 189. "Sonsonate." El Salvador.

Strigilla interrupta Mörch, *Malakozool. Blätter*, Bd. 7, December, 1860, p. 190. "Sonsonate." El Salvador.

Strigilla circercula Philippi, Dall, *Proc. U. S. Nat. Mus.*, Vol. 23, No. 1210, 1900, p. 305. Gulf of California to Panama.

Type Locality: Mazatlan, Mexico.

Range: Gulf of California to Ecuador.

Collecting Station: Nicaragua: Corinto (200-D-11, 19, also beach), 8-13 fathoms, sand, mangrove leaves.

Description: Shell small, usually less than 1 cm. in length, rounded, elongated posteriorly, polished, white, with pink color usually confined to the umbonal region; sculptured with fine radial striae which on the anterior area are curved and very much more widely spaced.

A large right valve of this beautiful little

species, dredged off Corinto, Nicaragua, in 13 fathoms, measures: length, 9.5 mm.; height, 8.5 mm.; convexity (one valve), 2.5 mm.

The smaller size, pink colored umbonal area, and much wider spaced sculpture on the anterior area, are characters which serve to separate the shell of *Strigilla cicercula* from that of the young of *S. costulifera* Mörch.

Strigilla pisiformis Linnaeus, which occurs in the Caribbean region, is a very similar species.

Distribution: This species was collected by the expedition at Corinto, Nicaragua, on the beach and dredged at depths of 8 to 13 fathoms.

Strigilla costulifera Mörch.

Plate I, Fig. 15.

Tellina carnaria Linnaeus, Hanley, *Thes. Conch.*, Vol. 1, 1846, p. 260 (in part), pl. 56, fig. 38 [West Colombia record only].

Not *Tellina carnaria* Linnaeus. Caribbean region.

Tellina (Strigilla) fucata Gould, *Proc. Boston Soc. Nat. Hist.*, Vol. 4, November, 1851, p. 91. Pacific coast [No exact locality cited].—Gould, *Boston Jour. Nat. Hist.*, Vol. 6, October, 1853, p. 399, pl. 16, fig. 4. "Inhabits Mazatlan."

Not *Tellina fucata* Hinds, *Zool. Voy. Sulphur, Moll.*, Pt. 3, 1844, p. 67, pl. 21, fig. 4.

Strigilla costulifera Mörch, *Malakozool. Blätter*, Bd. 7, December, 1860, p. 189. "Sonsonate." El Salvador.

Tellina chroma Salisbury, *Proc. Malacol. Soc. London*, Vol. 21, Pt. 2, July, 1934, p. 84. New name for *Tellina (Strigilla) fucata* Gould, 1851, not *Tellina fucata* Hinds, 1844.

Type Locality: Sonsonate, El Salvador.

Range: Magdalena Bay, Lower California, to the Gulf of California and south to Ecuador.

Collecting Stations: Mexico: Tenacatita Bay, beach; Sihuatanejo Bay, beach; Nicaragua: Corinto (200-D-16), 4-7 fathoms, mangrove leaves.

Description: Shell suborbicular, the anterior side much the shorter, moderately thick, glossy, pink, rose or white ringed with pink or carmine; umbos smooth; the ornamentation consists of striae, anteriorly flexuous, forming an angle with those on the central area, which usually radiate obliquely posteriorly; on the posterior slope the striae are fine and usually meet at an acute angle; a lunule present; hinge with a bifid cardinal and two laterals in each valve; one or two thickened rays often present interiorly; the pallial sinus touches the anterior adductor impression and is confluent with the pallial line below; the interior is often of a beautiful deep red or carmine color.

Dall pointed out that the shell of this species is very inconstant in details of sculpture, color, and in the presence or absence of a smooth radial streak on each valve.

A very large specimen of this species from Magdalena Bay, Lower California, in the

⁸³ *Apolymetis* cf. *A. dombei* (Hanley), Stewart, *U. S. Geol. Surv., Prof. Paper* 195, 1940 (issued June 7, 1941), p. 93, pl. 32, fig. 2. *Siphonalia* zone in North Dome, Kettleman Hills, San Joaquin Valley, California. Etchegoin formation, upper Pliocene.

Henry Hemphill collection of the California Academy of Sciences, measures approximately: length, 25 mm.; height, 23 mm.; convexity (both valves together), 10.3 mm. The specimens in the present collection are smaller.

Strigilla costulifera is very similar to the east American *S. carnaria* Linnaeus. The west American shell is often somewhat more rounded and the striae appear to be less numerous.

Distribution: Specimens of *Strigilla costulifera* were taken by the expedition on the beaches along western Mexico and dredged in 4 to 7 fathoms at Corinto, Nicaragua.

***Strigilla disjuncta* Carpenter.**

Plate I, Fig. 20.

Strigilla disjuncta Carpenter, *Proc. Zool. Soc. London*, November 11, 1856, p. 160. "Hab. In Sinu Panamensi; legit. T. Bridges."

Type Locality: Bay of Panama.

Range: Corinto, Nicaragua, to Panama.

Collecting Station: Nicaragua: Corinto (200-D-11), 8 fathoms, sand.

Description: S. testa satis magna, alba, tenui, planata; inaequaliter, postice producta; marginibus dorsalibus subrectis, ad angulam 120°, aliis bene arcuatis; lineis incrementi vix monstrantibus; lineis undulatis exillimis, antice concentricis, umbones versus ascendentibus, sinu angustiore; dein ad marginem ventralem rapide descendentibus; dein subito, angulo acuto, circiter 20° postice rursus ascendentibus; lineis angularum in valva utraque haud convenientibus; margine postico sinuato, sculptura postea fortiore; margine antico quoque sinuato; lunula distincta, sinuata; ligamento subelongato; dent. card. valva altera uno parvo et uno magno bifido; altera uno parvo bifido; dent. lat. acutioribus, haud distantibus. Long. 1.35, lat. 1.54, alt. .54 poll. (Original description).

"Allied to *S. sincera* Hanl.; remarkable for its large size and very fine markings, and named from the lines of markings in the two valves not agreeing at the edges." (Carpenter).

Compared to *Strigilla costulifera* Mörch, the shell of *S. disjuncta* is usually larger and the shell is thinner, flatter, more produced anteriorly, the beaks are more projecting and beneath them the dorsal margin is more concave. It is generally white or white tinged with pink.

A large specimen collected at Panama by James Zetek measures: length, 36 mm.; height, 31 mm.; convexity (both valves together), 13.8 mm.

This species has been cited from west American waters under the name of *Strigilla sincera* Hanley⁸⁴ which, according to Hedley⁸⁵, is an Australian species. Salisbury⁸⁶ in 1934 stated that *Strigilla sincera* occurs in the Panamic area but he did not mention Hedley's remarks on that species.

Distribution: Two single valves of this species were dredged by the expedition at Corinto, Nicaragua, in 8 fathoms, and one valve was taken on shore. This is an extension north of the known range of the species.

***Strigilla lenticula* Philippi.**

Plate I, Fig. 21.

Tellina lenticula Philippi, *Zeit. f. Malakozool.*, Jahrg. 3, February, 1846, p. 19. "Patria: Mazatlan."

Strigilla serrata Mörch, *Malakozool. Blätter*, Bd. 7, December, 1860, p. 189. Central America.

Strigilla lenticula Philippi, Dall, *Proc. U. S. Nat. Mus.*, Vol. 23, No. 1210, 1900, p. 305. Cape San Lucas to Central America.

Type Locality: Mazatlan, Mexico.

Range: Cape San Lucas, Lower California, to Corinto, Nicaragua.

Collecting Stations: Nicaragua: Corinto (200-D-11, 17, 19, also on beach), 7-13 fathoms, sand, mangrove leaves.

Description: Shell small, about 8 mm. in length, rounded, inflated, white, sculptured with well-developed, oblique, incised striae which posteriorly develop small chevron-shaped sinuations.

A large right valve of this species, dredged off Corinto, Nicaragua, in 13 fathoms, measures approximately: length 8 mm.; height, 7 mm.; convexity (one valve), 2.7 mm.

The rounded form, white color, and slight development of V-shaped sinuations in the sculpture posteriorly are characters which easily serve to separate this species from others of the genus in west American waters.

Strigilla flexuosa Say, an east American species, is a very similar form.

Distribution: This little species was taken by the expedition only at Corinto, Nicaragua, on the beach and at depths of 7-13 fathoms.

⁸⁴ *Tellina sincera* Hanley, *Proc. Zool. Soc. London*, April, 1844, p. 68. "Hab.—? Mus. Cuming, Metcalfe." —Hanley, *Thes. Conch.*, Vol. 1, 1846, p. 261, pl. 60, fig. 144. [Not the record "N. W. Coast of America, (Dr. Sinclair)," according to Hedley].

⁸⁵ *Strigilla sincera* Hanley, Hedley, *Proc. Linn. Soc. New South Wales*, Vol. 38, Pt. 2, 1913, p. 272. *Strigilla grossiana* Hedley, 1908, was considered by Hedley to be a synonym of *S. sincera* Hanley.

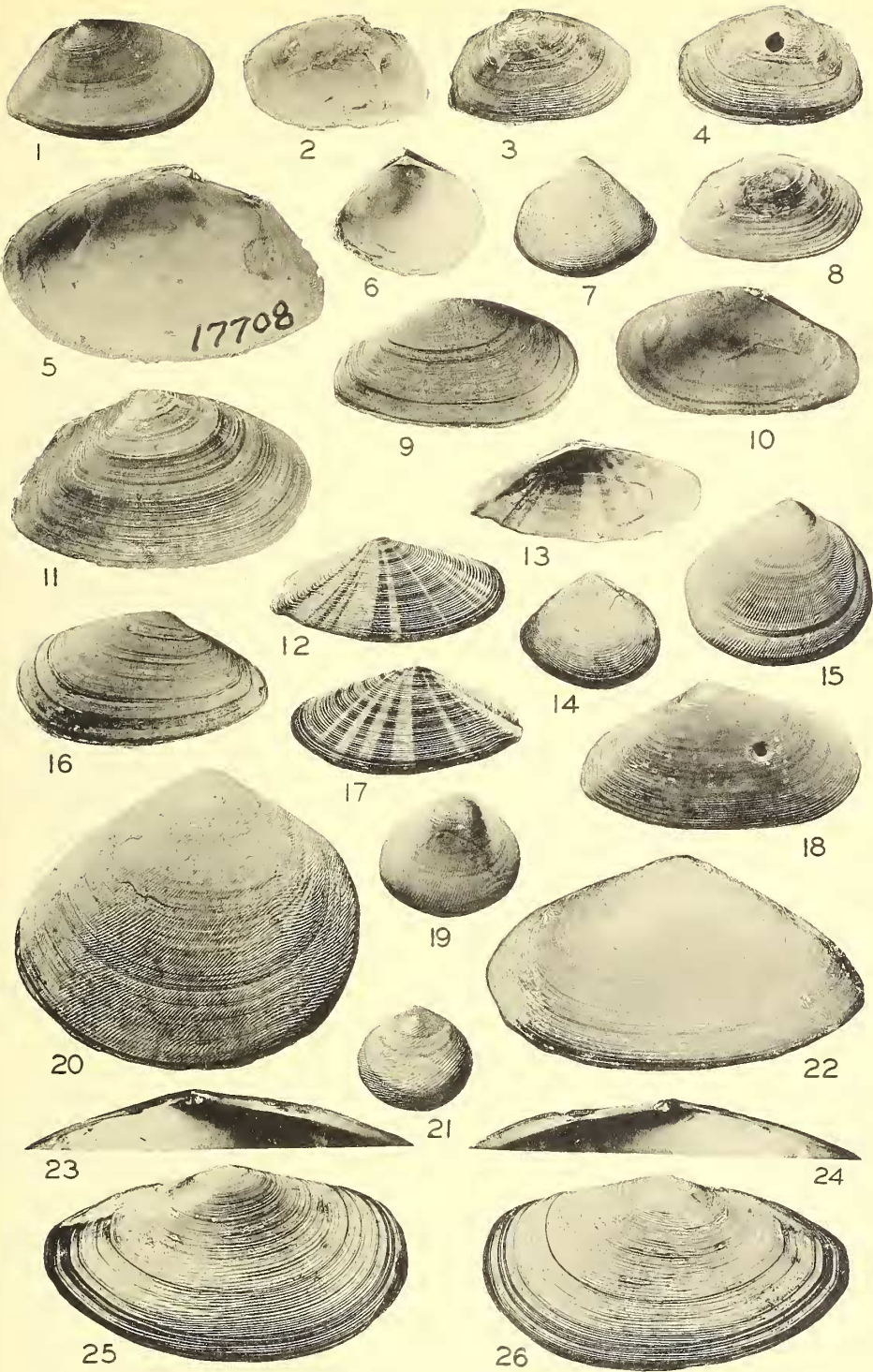
⁸⁶ Salisbury, A. E., *Proc. Malacol. Soc. London*, Vol. 21, Pt. 2, July, 1934, p. 89.

EXPLANATION OF THE PLATE.

PLATE I.

- FIG. 1. *Tellina (Moerella) felix* Hanley. Hypotype, right valve, from Monypenny Point, Gulf of Fonseca, Nicaragua. Length, 17 mm.; height, 10 mm. View of exterior. P. 70.
- FIG. 2. *Tellina (Moerella) recurvata* Hertlein & Strong, sp. nov. Holotype, right valve, from Loc. 23802 (C.A.S.), San Luis Gonzaga Bay, Lower California, in the Gulf of California. Length, 12 mm., height, 7.5 mm. P. 71
- FIG. 3. *Tellina (Moerella) recurvata* Hertlein & Strong, sp. nov. Holotype. View of the exterior of the specimen shown in Fig. 2.
- FIG. 4. *Tellina (Moerella) recurvata* Hertlein & Strong, sp. nov. Holotype, left valve. View of the exterior of the left valve of the specimen shown in Figs. 2 and 3.
- FIG. 5. *Tellina (Moerella) arenica* Hertlein & Strong, sp. nov. Holotype, right valve, from Station 136-D-20, Lat. 23° 30' N., Long. 109° 26' W., Arena Bank, Gulf of California, dredged in 43 fathoms (78 meters), mud. View of interior. P. 68.
- FIG. 6. *Tellina (Merisca) proclivis* Hertlein & Strong, sp. nov. Holotype, left valve, from Loc. 20299 (C.A.S.), Magdalena Bay, Lower California, Mexico. Length, 9 mm.; height, 7.8 mm. View of interior. P. 83.
- FIG. 7. *Tellina (Merisca) proclivis* Hertlein & Strong, sp. nov. Holotype. View of the exterior of the specimen shown in Fig. 6.
- FIG. 8. *Tellina (Moerella) recurvata* Hertlein & Strong, sp. nov. Paratype, right valve, from the same locality as the holotype shown in Figs. 2, 3 and 4. Length, 11.5 mm.; height, 7 mm.
- FIG. 9. *Macoma (Psammacoma) panamensis spectri* Hertlein & Strong, subsp. nov. Paratype, right valve, from Station 143-D-3, Lat. 26° 57' N., Long. 111° 56' W., Santa Inez Bay, Lower California, in the Gulf of California, dredged in 35 fathoms (64 meters), mud, crushed shell. Length, 33.8 mm.; height, 18 mm. P. 91.
- FIG. 10. *Macoma (Psammacoma) panamensis spectri* Hertlein & Strong, subsp. nov. Paratype. View of the interior of the specimen shown in Fig. 9.
- FIG. 11. *Tellina (Moerella) arenica* Hertlein & Strong, sp. nov. Holotype. View of the exterior of the specimen shown in Fig. 5.
- FIG. 12. *Tellina (Tellinella) zacae* Hertlein & Strong, sp. nov. Holotype, right valve, from Station 136-D-1, Lat. 23° 29' N., Long. 109° 25' W., Arena Bank, Gulf of California, dredged in 45 fathoms (82 meters), mud. Length, 33.4 mm.; height, 15.2 mm. P. 65.
- FIG. 13. *Tellina (Tellinella) zacae* Hertlein & Strong, sp. nov. Holotype, left valve. View of the interior of the left valve of the specimen shown in Fig. 12.
- FIG. 14. *Tellina (Merisca) proclivis* Hertlein & Strong, sp. nov. Holotype, Right valve of the specimen shown in Figs. 6 and 7.
- FIG. 15. *Strigilla costulifera* Mörch. Hypotype, right valve, from Loc. 4798 (C.A.S.), Lower California; Henry Hemphill Coll. Length, 25 mm.; height, 22 mm. P. 95.
- FIG. 16. *Macoma (Psammacoma) panamensis spectri* Hertlein & Strong, subsp. nov. Holotype, left valve, from the same locality as the paratype shown in Figs. 9 and 10. Length, 34.4 mm.; height, 18.4 mm. P. 91.
- FIG. 17. *Tellina (Tellinella) zacae* Hertlein & Strong, sp. nov. Holotype. View of the exterior of the specimen shown in Fig. 13. P. 65.
- FIG. 18. *Tellina (Eurytellina) inaequistriata* Donovan. Hypotype, right valve, from Station 195-D-21, Lat. 15° 44' 45" N., Long. 96° 06' 55" W., Santa Cruz Bay, Mexico, dredged in 18 fathoms (33 meters), mud, crushed shell. Length, 23 mm.; height, 12.5 mm. P. 74.
- FIG. 19. *Strigilla cicercula* Philippi. Hypotype, right valve, from Station 200-D-19, Lat. 12° 28' 03" N., Long. 87° 12' 39" W., Corinto, Nicaragua, dredged in 12-13 fathoms (22-24 meters), mangrove leaves. Length, 9.6 mm.; height, 8.5 mm. P. 95.
- FIG. 20. *Strigilla disjuncta* Carpenter. Hypotype, right valve, from Panama; James Zetek Coll. Length, 36 mm.; height, 31.3 mm. P. 96.
- FIG. 21. *Strigilla lenticula* Philippi. Hypotype, right valve, from the same locality as the specimen shown in Fig. 19. Length, 7.9 mm.; height, 7.0 mm. P. 96.
- FIG. 22. *Tellina (Eurytellina) planulata* Sowerby. Hypotype, left valve, from 1 mile south of entrance to Golfito Bay, Costa Rica. Length, 51.8 mm.; height, 29.5 mm. P. 76.
- FIG. 23. *Tellina (Scissula) nicoyana* Hertlein & Strong, sp. nov. Holotype, right valve, from Ballena Bay, Costa Rica. Length, 34.4 mm.; height, 19 mm. View of hinge. P. 85.
- FIG. 24. *Tellina (Scissula) nicoyana* Hertlein & Strong, sp. nov. Holotype, left valve. View of hinge.
- FIG. 25. *Tellina (Scissula) nicoyana* Hertlein & Strong, sp. nov. Holotype, right valve. View of the exterior of the specimen shown in Fig. 23. P. 85.
- FIG. 26. *Tellina (Scissula) nicoyana* Hertlein & Strong, sp. nov. Holotype, left valve. View of the exterior of the specimen shown in Fig. 24. P. 85.

All the specimens illustrated on this plate are in the type collection of the Department of Paleontology of the California Academy of Sciences.



MOLLUSKS FROM THE WEST COAST OF MEXICO AND CENTRAL AMERICA.